

SYSTEM SOFTWARE 7.0 — IN-DEPTH PREVIEW

MACWORLD

The Macintosh[®] Magazine

August 1989 \$3.95

Canada \$4.95

Why Is This Man Smiling?

APPLE'S JEAN-LOUIS GASSÉE
SEE PAGE 124

1989 WINNERS
Computer Graphics on the Mac

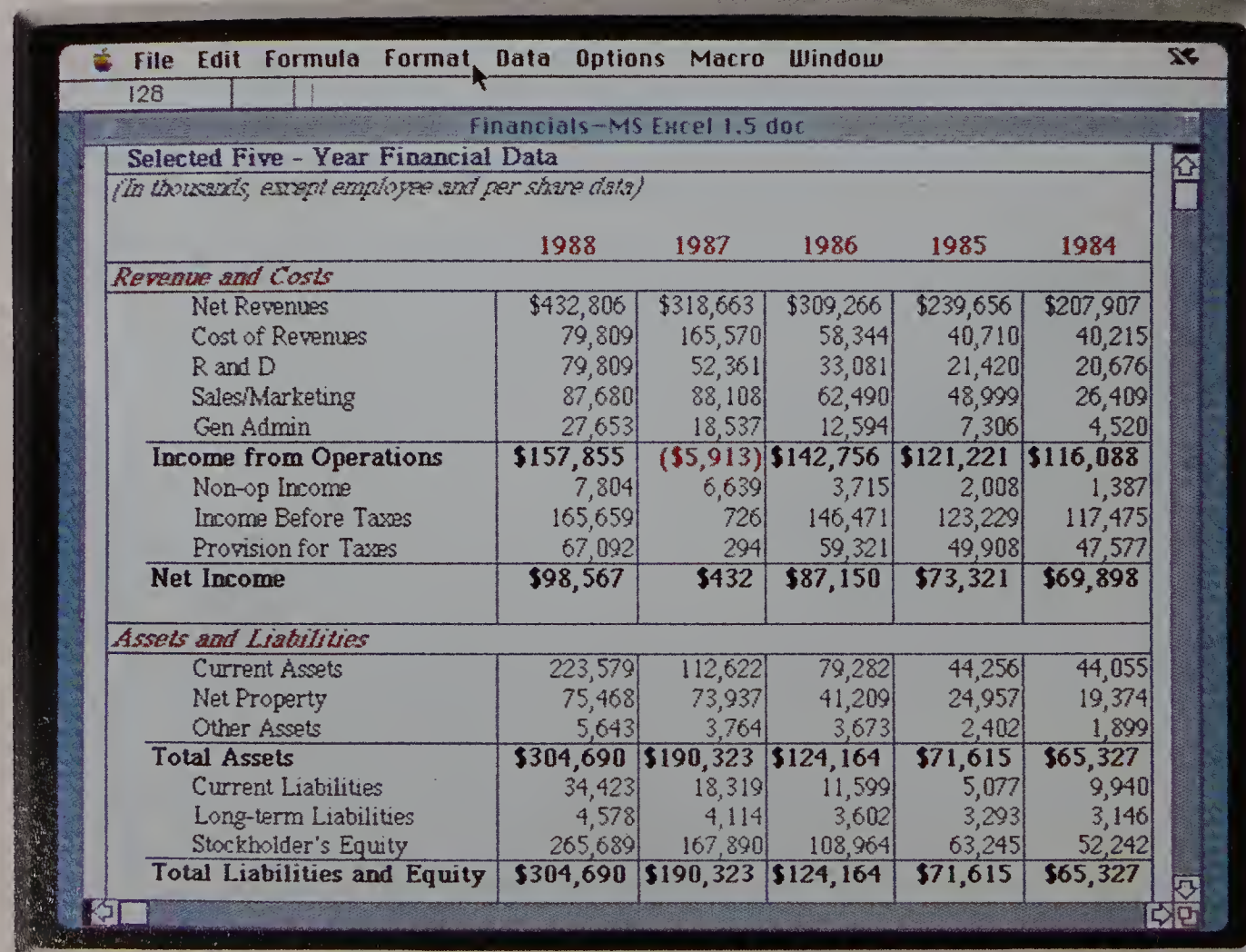
8 DRAW PROGRAMS
Which One to Buy

MAKING THE BEST TABLES
A Step-by-Step Guide

12 COLOR MONITORS
Lab Testing for Image Quality



90% of Macintosh spreadsheet users have been working on this program.

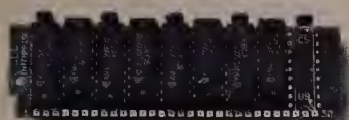


	1988	1987	1986	1985	1984
Selected Five - Year Financial Data <i>(In thousands, except employee and per share data)</i>					
Revenue and Costs					
Net Revenues	\$432,806	\$318,663	\$309,266	\$239,656	\$207,907
Cost of Revenues	79,809	165,570	58,344	40,710	40,215
R and D	79,809	52,361	33,081	21,420	20,676
Sales/Marketing	87,680	88,108	62,490	48,999	26,409
Gen Admin	27,653	18,537	12,594	7,306	4,520
Income from Operations	\$157,855	(\$5,913)	\$142,756	\$121,221	\$116,088
Non-op Income	7,804	6,639	3,715	2,008	1,387
Income Before Taxes	165,659	726	146,471	123,229	117,475
Provision for Taxes	67,092	294	59,321	49,908	47,577
Net Income	\$98,567	\$432	\$87,150	\$73,321	\$69,898
Assets and Liabilities					
Current Assets	223,579	112,622	79,282	44,256	44,055
Net Property	75,468	73,937	41,209	24,957	19,374
Other Assets	5,643	3,764	3,673	2,402	1,899
Total Assets	\$304,690	\$190,323	\$124,164	\$71,615	\$65,327
Current Liabilities	34,423	18,319	11,599	5,077	9,940
Long-term Liabilities	4,578	4,114	3,602	3,293	3,146
Stockholder's Equity	265,689	167,890	108,964	63,245	52,242
Total Liabilities and Equity	\$304,690	\$190,323	\$124,164	\$71,615	\$65,327

So have we. Introducing Microsoft Excel 2.2.

In 1985, not long after the Macintosh® was unveiled, Microsoft® Excel became the most compelling reason to buy one.

Within minutes, it became a standard on the Macintosh. Before we knew it, a full 9 out of 10 Macintosh spreadsheet users were swearing by it. Not surprisingly, they still are.



Used to be, 1MB was enough. Now with Microsoft Excel 2.2, you can take full advantage of the 8 megs in today's most powerful Macintoshes.

But, of course, we weren't satisfied to leave well enough alone—and Microsoft Excel version 2.2 has come to the small screen. In a big way.

In mathematical terms, 2.2 is greater than 1.5. In technical terms, your spreadsheets aren't limited to 1MB of memory—version 2.2 makes the most of even 8meg machines.

Which translates into spreadsheets of outrageous proportions.

Equally outrageous: 40% faster calculations—thanks to advanced intelligent recalc.

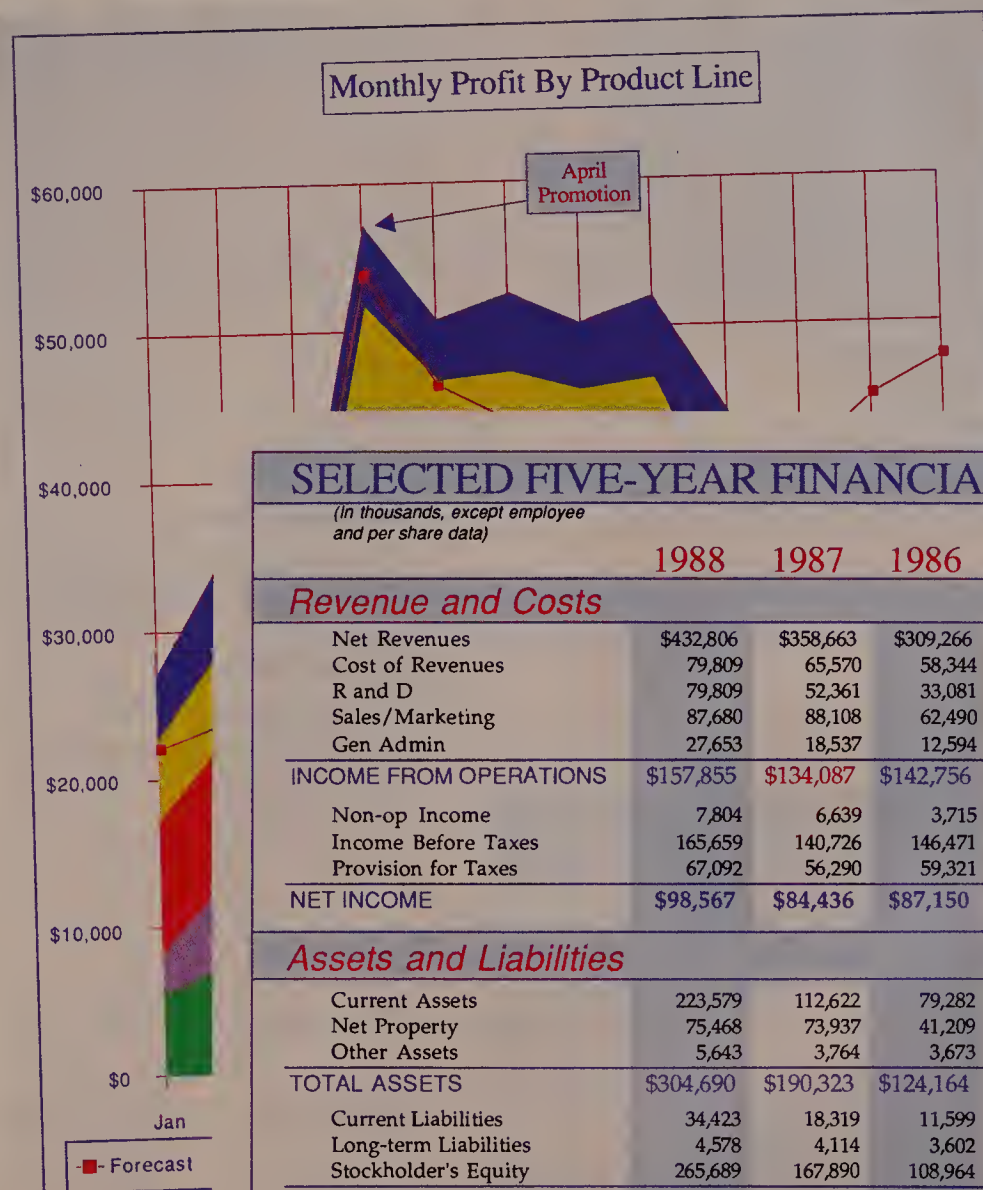
As for presentation? Version 2.2 also lets you highlight data in ways well worth highlighting: You can pick up to 256 different fonts per sheet, including up to six styles and eight colors. You can change row height. You can shade. And basically pack your documents with more visual punch than ever before.

Microsoft Excel version 2.2. Another improvement designed to make Mac® enthusiasts even more enthusiastic.



Something 90% of you are already used to. And you other 10% easily can be.

Microsoft
Making it all make sense.™



SELECTED FIVE-YEAR FINANCIAL DATA

(In thousands, except employee and per share data)

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TOTAL LIABILITIES & EQUITY	\$304,690	\$190,323	\$124,164	\$71,615	\$65,327
Working Capital	189,642	173,468	127,766	119,489	77,041
Number of Employees	3,456	2,727	1,681	1,390	1,086
Common Stock Data					
Net Income per Share	\$1.13	\$1.64	\$1.94	\$1.90	\$2.59
Book Value per Share	\$4.56	\$3.56	\$2.29	\$1.46	\$0.78
Cash and Investments	\$2.65	\$1.60	\$0.83	\$0.64	\$0.48
Average Shares Out	87,535	83,258	44,956	38,634	26,984
Shares Out/Year-end	86,790	51,305	26,589	15,905	9,082
Key Ratios					
Return on Net Revenues	23%	23%	28%	31%	34%
Return on Total Assets	32%	44%	70%	102%	107%
Return on Stock Equity	37%	50%	80%	116%	134%

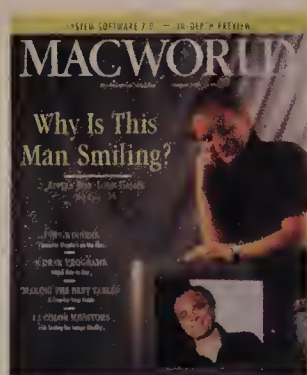
Now pick from 256 fonts. Change row height. Shade. Add notes. And get used to the sound of applause.

MACWORLD

The Macintosh® Magazine

August 1989

DEPARTMENTS



Apple previews the Mac's latest system software, due sometime next year. To sample System 7.0's major revisions—everything from outline fonts to virtual memory—see page 124. (Photo by Paul Franz-Moore.)

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By Jim Heid/Learn how to diagnose, fix, and even prevent some common Mac ailments.

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Make sure that second-hand Mac gets a clean bill of health before you take it home, page 57.

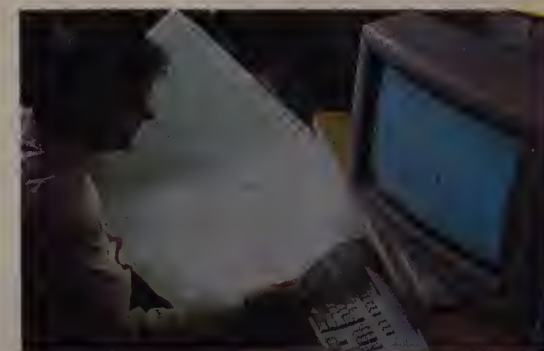
NEWS

Mac Bulletin 15

Late-breaking news.

Macworld News 99

■ **32-Bit Color for QuickDraw—At Last** Over 16 million colors. ■ **Engineering a Coup** A roundup of engineering products. ■ **A New Chartmaker and a New Word Processor** Low-cost charting and wp. ■ **Remote Control Steals the Show** Mouse-free presentations. ■ **HyperCard Book Roundup: The Sequel** More for the stack-happy. ■ **When a Keyboard Isn't Enough** Enter handwritten data with a gesture. ■ **Mac Font Update** Adobe alternatives. ■ **Radius Strikes a Color Chord** 32-bit QuickDraw boards. ■ **Speeding Up SCSI Transfers** Faster Mac II disk access. ■ **New CAD on the Block** Intergraph's high-end CAD. ■ **CD ROM Starts Spinning in the Mac World** CD ROM takes off. ■ **Statistics, Anyone?** Data manipulation. ■ **Hope for Desktop Color Separations** 4-color "breakthrough". ■ **Survey Says: The '030** Readers opt for 68030-based Macs. ■ **Incoming Faxes** Two fax modems.



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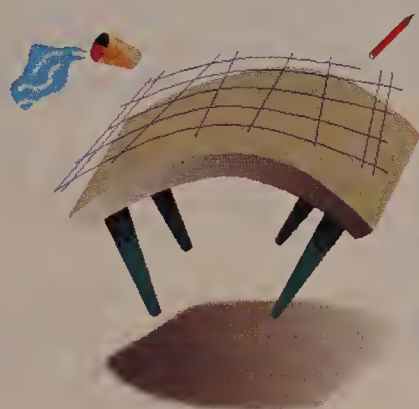
By Steve McKinstry/Object-oriented draw programs are more responsive and accurate than ever. Find out which is the fastest draw.

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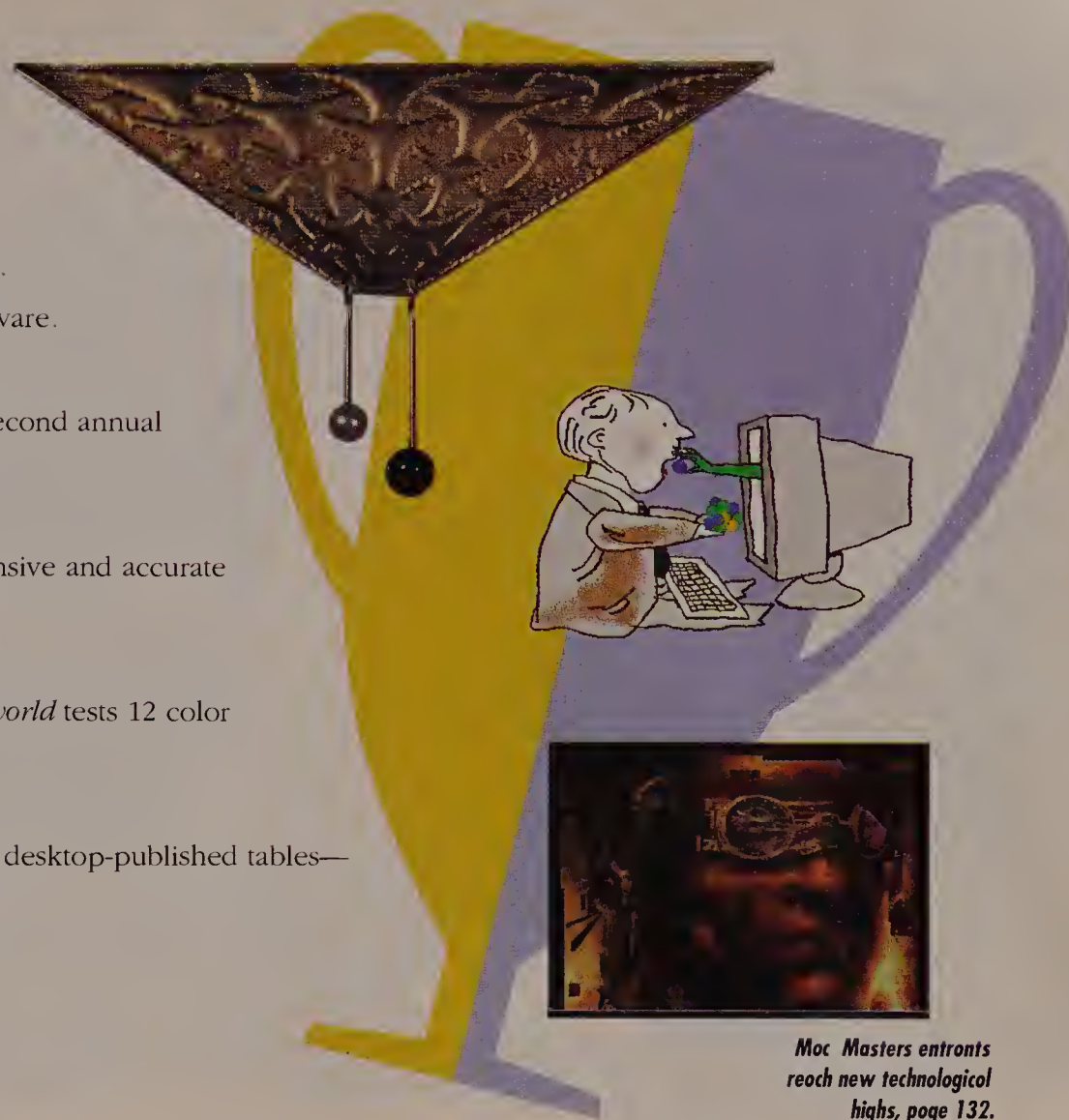
By Adrian Mello/Which color monitors are the brightest stars? *Macworld* tests 12 color display systems.

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By Steve McKinstry/Learn how to take the frustration out of creating desktop-published tables—just follow these step-by-step lessons.



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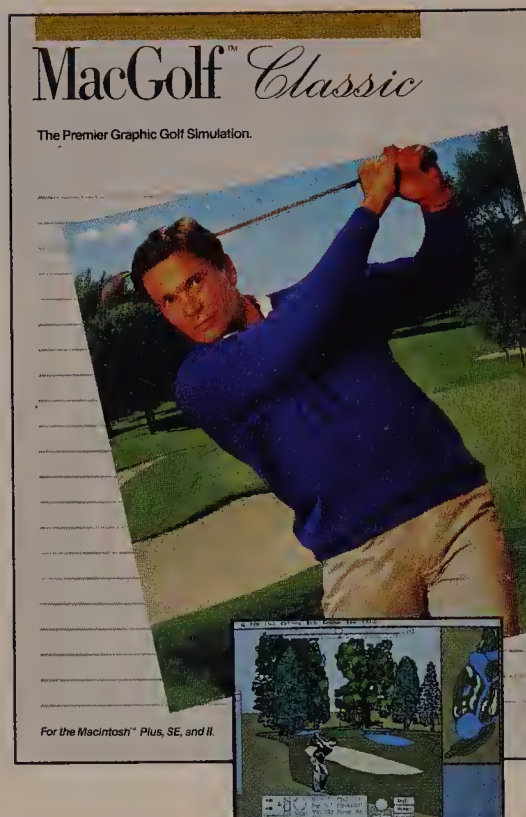
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Publisher's statement can be found on page 10.

Circle 291 on reader service card.

Circle 290 on reader service card



House.



Senate.

We found a measure they could both agree on.

Up on the hill it looked like another split along party lines. Both Macintosh and PC users fought for access to the same information. Until a TOPS network brought them together in bipartisan agreement, that is.

TOPS Tech Specs

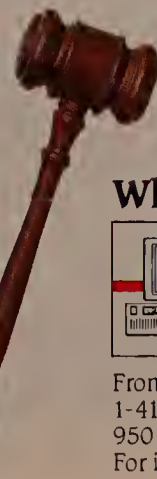
- TOPS supports AppleTalk and FlashTalk running on twisted-pair cabling (telephone wire), and EtherTalk on thick or thin Ethernet cabling.
- All IBM PCs, PS/2 Models 25 or 30, or compatibles require TOPS FlashCard, 3Com EtherLink II or Western Digital EtherCard Plus. PS/2 Models 50 through 80, or compatibles require 3Com EtherLink/MC card.
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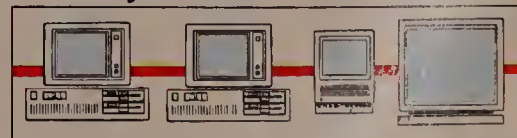
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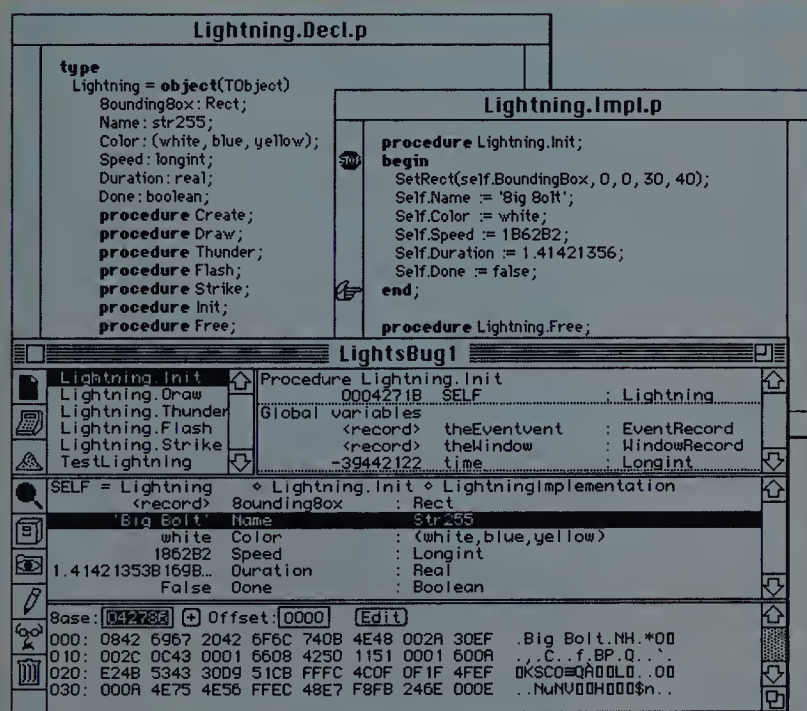
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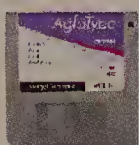
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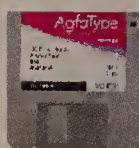
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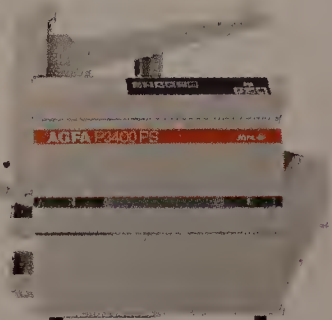
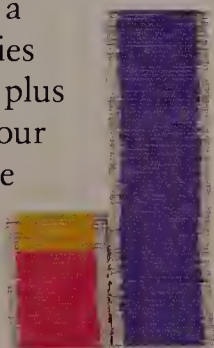
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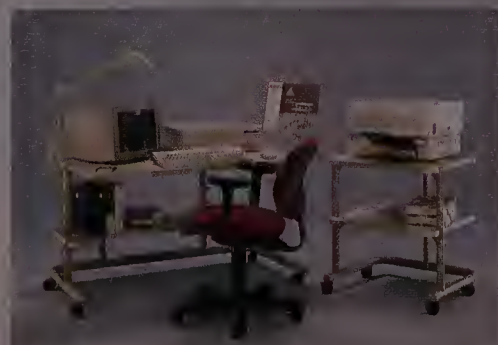
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August 1989, Volume 6, Number 8

Macworld (issn 0741-8647) is published monthly by IDG Communications, Inc., 501 Second Street, San Francisco, CA 94107. Subscription rates are \$30 for 12 issues, \$60 for 24 issues, and \$90 for 36 issues. Foreign orders must be prepaid in U.S. funds with additional postage. Add \$16 per year from Canada and Mexico; add \$16 per year for surface mail or \$95 per year for airmail from all other countries. Second-class postage paid at San Francisco. POSTMASTER: Send address changes to Macworld, P.O. Box 54529, Boulder, CO 80323-4529. For dealer inquiries, call 800/621-5461, in California 800/521-8455. Editorial and business offices: 501 Second St., San Francisco, CA 94107, 415/243-0505. Macworld is a publication of IDG Communications, Inc. Macworld is an independent journal not affiliated with Apple Computer, Inc. APPLE, the APPLE LOGO, MAC, MACINTOSH, and MACWORLD are registered trademarks and MACLETTER is a trademark of Apple Computer, Inc. Printed in the United States of America. Copyright 1989 IDG Communications, Inc. All rights reserved. Macworld is a member of IDG Communications, the world's largest publisher of computer-related information. IDG Communications publishes over 80 computer publications in more than 28 major countries. Fourteen million people read one or more IDG Communications publications each month.

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That's how *Publish!* magazine characterized our Business LaserPrinter (BLP), a Postscript® printer for Macintoshes®, IBM's® and IBM clones. We'd only add that the future has arrived ahead of schedule.

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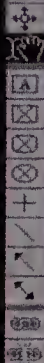
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Circle 11 on reader service card



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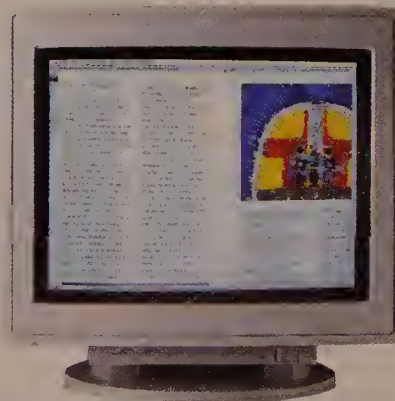
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The Radius Color Display showing two full pages. (1152 x 882 pixels)



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Circle 46 on reader service card



Michael Backes, film industry computer systems consultant, and Van Ling, creative and technical assistant to James Cameron, director of the new 20th Century Fox film The Abyss.

“We put the Jasmine DirectDrive through hell, but it got us through ‘The Abyss.’”

“Fifteen months ago, we started working on a new underwater adventure movie called *The Abyss*. We needed a hard drive that could stand up to the worst possible circumstances. So we got two Jasmine DirectDrives.™ And immediately, we put them in the worst possible circumstances.

“We took them down to a hot, dusty place called Gaffney, South Carolina, where the majority of the film was shot. We put them in dirty rooms. We ran them almost 24 hours a day for over a year. They were dropped, they were covered with dust, they were bounced from location to location, they were used and abused—and they still worked great. We put them through as much hell as *we* went through. If anybody could break a drive, we could, and we didn’t. They really performed for us.

“Often, we wouldn’t have time to back everything up, so we just had to rely on the Jasmine drives to run properly all the time. And, even when they were really put through the ringer and we thought we were going to lose everything, the Symantec™ Utilities for Macintosh that come with the drives really saved us.

“We basically had the entire movie on those Jasmine drives. They were used to store storyboard scans, script changes,

animation tests, and various files covering every aspect of the film. This took up hundreds of megabytes of disk space, because the storyboards that we scanned into our Macintoshes® were constantly being revised and updated, and we couldn’t afford to throw anything away during filming.

“The drives are still working great. We figure they’ll probably have a long career in this business! And because they held up so well under pressure, so did we.”

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Circle 21 on reader service card

MAC BULLETIN

INDUSTRY NOTES

Hell with Aldus

Hell Graphics Systems is the first major pre-press vendor to announce support for Aldus' proposed Open Pre-press Interface. OPI lets prepress systems accept desktop publishing files in standard PostScript format without forcing the prepress vendors to give up their own proprietary formats.

Schlumberger Sells Plotter Division

Océ is buying Schlumberger's \$125 million graphics division, which makes pen plotters and electrostatic plotters, including a Macintosh-compatible PostScript plotter. For more information, call Schlumberger at 408/922-3112.

Mac ROM Exposed

A group calling itself the nuPrometheus League has begun distributing free copies of source code for the Mac's ROM and other closely guarded Mac code. Though possession of the code is illegal, access to it would make it possible to produce a fully functional Macintosh clone.

New Adobe Font Strategy

Faced with the expanded role of QuickDraw and Apple's final rejection of Display PostScript, Adobe has announced the Adobe Type Manager. ATM will generate fonts for the Mac screen and for non-PostScript printers from Adobe's PostScript fonts. Adobe head John Warnock said ATM should be available by this fall, assuming font-licensing issues can be resolved.

Apple, Tandem Join Forces

Apple, Tandem, and the State of California announced a joint program to develop a Macintosh front end for Tandem mainframe computers in use at the state's principal data processing center. Apple and Tandem are expected to make other joint-development announcements soon.

Apple Reveals System 7.0

Apple's new System, which it expects to deliver early next year, features embedded support for the SQL minicomputer and mainframe database standard; Inter-Application Communication, which makes it possible to dynamically **share data across different applications**; a new print-driver architecture that will support many more printers and simplify developing new printer drivers; and a much-improved Finder. System 7.0 will require 2MB of memory, and many older or nonstandard applications are likely to be incompatible with it. For a more detailed report, see "Here Comes System 7.0" in this issue.

HP Moves DeskJet Printer to the Mac

Hewlett-Packard has designed a **Mac-compatible version of its popular DeskJet printer**, which offers 300-dpi resolution in an inexpensive desktop model. The DeskWriter will list for \$1195 and print about 1 page per minute, or 2 pages per minute in draft mode. Completely QuickDraw-compatible, it includes a Chooser-level printer resource and cable. HP expects to begin shipping the printer in early July. For more information, call Hewlett-Packard at 800/752-0900.

RasterOps Ships SE Display and Accelerator Subsystem

Last month RasterOps Corporation began shipping its ClearVue/SE, a **combination CPU accelerator, display board, and 19-inch monochrome monitor for the Mac SE**. The accelerator, which is integrated into the display board, bumps the SE's processing speed from 8MHz to 16MHz. The display board refreshes the monitor at 72Hz, and allows the SE's internal screen to function as a second monitor or zoom window. The ClearVue/SE subsystem retails for \$1995. The company is also shipping a similar display board/accelerator, the \$695 ClearVue/SE APD, for Apple's Page Display monitor. For more information, call RasterOps at 408/562-4200.

Database News Beat

Major upgrades to at least three databases should have arrived by the time you read this. **Odesta's Double Helix II is graduating to Double Helix 3.0**. The new version features greatly enhanced speed, the ability to use VAX files in their native format, and HyperCard-like buttons that trigger sequences of events.

From ProVue Development comes Panorama 1.1, which adds support for imported EPS graphics, more sophisticated text calculations, new time and financial functions, more chart styles, and the ability to use sounds in a database design.

Finally, **the unusual graphics-based Business Filevision is becoming Filevision IV** and adding support for PICT, EPS, gray scale and color, a 30-by-32-inch-maximum layout, 32 database layers per file, and integrated text and graphics import and export. For more information, contact Odesta at 312/498-5615; ProVue at 714/892-8199; and Marvellin at 213/450-6813.

Blyth Is Back with Omnis 5.0

Blyth Software is reemerging with a **new and impressive version of Omnis**. Version 5.0 sheds the ugly, text-based interface of yesterday and comes with tools built in for creating Mac-like applications. For the end user, the new version supports radio buttons; real Mac windows, dialogs, and menus; and background graphics with live buttons. For the developer, there is support for CL/1, a set of XFCNs and XCMDs for communicating with HyperCard, multiuser support, and a user-friendly code-cutting environment. Omnis 5.0 for the Macintosh will list for \$695 and should be available *(continues)*

INDUSTRY NOTES

Mac Bible Gets to Works

The publisher of the popular Macintosh Bible plans to publish a tutorial and reference for Microsoft Works 2.0, written by well-known Macintosh wizard Sharon Zardetto Aker. Goldstein & Blair's new book should be available this fall.

Upgrades Come Down

MacProducts USA has dropped the prices of its memory upgrades and add-on SCSI ports. Both 128K-to-512K and 512K-to-1MB upgrades now cost \$149, and a SCSI port costs \$69. For more information, call MacProducts USA at 512/343-9441.

Irwin Supporting MacPeak

MacPeak, vendor of mass storage and accelerator boards, has ceased retail operations. Irwin Magnetics owns a major share of MacPeak and will service and support MacPeak products and sell products now under development by the newly formed MacPeak Research. For information, call Irwin at 313/930-9000.

Semantic Microsystems Now Lightship Software

Semantic Microsystems of Beaverton, Oregon, has changed its name to Lightship Software. The company sells a line of AI software for the Mac, including Scheme Express, a compact byte code interpreter; MacScheme, a native code compiler; and MacScheme+Toolsmith; an applications-development system.

Softsel Connectivity Sales Up 800 Percent

The Connectivity Solutions division of Softsel Computer Products of Inglewood, California, has increased its sales by 800 percent since May of 1988. The division sells products for the Mac and the IBM PC and compatibles for more than 20 vendors.

Plus Finds a Home

Olduvai Software has firmed up a deal to market Format Software's German-born Plus in the United States. Plus extends HyperCard's free-form application-building capabilities with color, support for standard Mac windows and dialogs, and a scripting-language super-set of HyperTalk.

now; a code-compatible version for Windows should be available in July, and one for OS/2 in September. For more information, contact Blyth at 415/571-0222.

TrueForm Rides Again

Version 2.0 of TrueForm, the electronic forms-generation and forms-management package, has many new features: using **multiple search criteria to search through stacks of forms** (no relation to HyperCard stacks); grouping logically related fields to prevent data entry errors such as pushing more than one radio button in a group; more spreadsheet and database functions and operators; two levels of password protection; and built-in hooks for 4th Dimension databases. Version 2.0 has no drawing tools. At \$395, version 2.0 is \$100 less than the original release; registered owners of TrueForm 1.0 can upgrade at no cost. Version 2.0 should be available by the end of July. For more information, contact Adobe at 415/962-2000.

Taking Another Form

Shana Corporation is **readying its heavyweight forms product for market**. InFormed, like most other forms packages, is a two-module set, and the first module, InFormed Designer, should ship before the Boston Macworld Expo in August. It will list for \$295. The second module, InFormed Manager, will be released later. Informed Manager will list for \$195 and will have a database back-end built on Shana's database-development product, InsideOut. The first version of Manager will be flat-file, but a later version will take advantage of InsideOut's relational capabilities. For more information, contact Shana at 403/463-3330.

Relisys' Tefax Integrates Five I/O Functions

Relisys is now shipping Tefax System Model RA2110M, **an integrated thermal printer, graphics scanner, copier, fax machine, and fax modem for the Mac**. The \$1595 device operates at 200-by-100-dpi resolution or at 200-by-200. Relisys also will bundle Solutions' BackFax software, which supports full background communications from within Mac applications. BackFax, which normally lists for \$245, will be included gratis beginning in August, and people who bought Tefax before then will receive a free upgrade. For more information, call Relisys at 408/945-9000.

The Key to Planning

Symmetry is working with an Australian developer to design and bring KeyPlan to the United States market. Symmetry is billing KeyPlan as **a simple-to-use project-management tool that is not intended to satisfy professional project managers** but is powerful enough for most other business users. It imports Acta outlines and allows users to assign dependency in a PERT chart format, and from there it provides most of the features project managers need, such as critical path determination and manual resource leveling. Symmetry expects to ship KeyPlan in July. It will list for \$449. For more information, contact Symmetry at 602/844-2199.

A Very Secure Feeling

With Access Control Environment, nicknamed ACE, **users or system administrators can assign or deny privileges** for copying or deleting files; initializing disks; opening or moving folders; using DAs and applications; using printers, file servers, and other network devices ... in short, ACE makes it impossible for an unauthorized user to trespass in your electronic homestead. Users who take turns sharing a machine can each be assigned a separate, password-protected set of privileges. ACE also offers run-of-the-mill file encryption. ACE should begin shipping in the third quarter of 1989, at \$279 list. A 5-pack will list for \$895, and a 10-pack for \$1495. For more information, contact Casady & Greene at 408/624-8716.

Microsoft Word's Little Herald

The Cobb Group's *Word 4 Companion* by Gena B. Cobb, Allan McGuffey, and Judy Mynhier is **an essential supplement to Microsoft's manuals**. It's readable, thorough, and concise; the only criticism that can be made is that for anyone who read *Word Companion*, for Word 3.0, there is a lot of duplication. *Word 4 Companion* lists for \$22.95. For more information, contact the Cobb Group at 502/491-1900. **M**



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Macworld, May 1989

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Macworld, May 1989.

Cirrus drives are fast and quiet – most models boast a 1:1 interleave and 15 ms seek time. Cirrus drives are first in speed and silence in the Macworld tests. We achieve speed by pairing the finest 3-1/2" drive technology with the best software drivers available exclusively from La Cie. Cirrus is silent because La Cie uses 1/2 speed fans – found only in Cirrus drives.

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Macworld, May 1989.



La Cie offers you mass storage solutions from 30 to 610 megabytes. Except for the 610, all drives weigh under 4-1/2 pounds and measure less than 3"x6"x9". These compact units don't clutter up your desk-top and do fit into our shoulder-strapped Cordura carrying case or inside your brief-case for easy portability.

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MacUser, March 1989.

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Circle 145 on reader service card

Wishing on a Star

A list for the 1990s

by Jerry Borrell

So I'm sitting here. It's late. Another long day at the office. It's the usual San Francisco summer night. Fog-horns sounding outside my window. Cold. Ted Koppel is tackling another issue on the tube. Mayor Koch is about to begin a harangue when Ted takes a break for a commercial. And in that commercial Canon is promoting the bejesus out of its color copiers. This WASP in a Brooks Brothers suit holds up some great-looking color output. Suddenly, out of the depths of my mind, appears an image of Jean-Louis Gassée. (Gawd. What did this writer have for dinner, you ask?) Anyway, I'm recalling a time just after the Next announcement. Jean-Louis looked archly toward someone and said, "You think we don't know about the erasable optical technology Canon has? We're pretty good customers of theirs, by the way."

Well, one thing leads to another, and pretty soon I start to wonder whether the printing engine in that color copier could be driven by a Mac. All of which prompts me to walk over and switch off Hizzoner, and turn a once-productive mind toward what could be.

Okay, I admit the announcement of the new system software (which dealers will have available for customers next



winter) also has me charged up; thinking about the future. I was in the audience, watching the demos for System 7.0 at the Developer's Conference in May. At one session about the script manager, an Apple engineer, before my eyes, typed on a screen in what looked like handwriting. Over the decade that I have been working on computers and writing a lot, I've always wanted a typeface that looked like handwriting. As the demonstration progressed I learned that it is not a font, but the computer's ability to deal with ligatures—the curved lines that connect two letters (say, *ff* or *fi*)—that makes this possible. It seems so incremental an improvement, and yet that

revelation was ineffable. So if Apple is once again making some real headway in improving how computers work, it must be time to raise new challenges. (What can I tell you? People only write when something's wrong. Or before they're put under nondisclosure and still have the opportunity.)

UNOFFICIAL WISH LIST 1989

A low-cost Mac. Hmmm. No surprise there. After all, John Sculley has already preannounced it. It's more a question of when. Better not wish for Christmas; I never get what I want for Christmas. Spring would be nice. Now, down to particulars. Make it small, about the size of the old Apple 20-megabyte hard disk—just big enough for a system board (and using the same SIMM slots as the II family, please). Add a color ROM (32-bit QuickDraw), and one expansion slot. And listen, willya? Make the damn thing so I can open it like a Mac II and just add stuff without having to rattle through my tool drawer.

Yo, put Ethernet on this machine. Sure, I know it costs a lot. We all have problems. (You should see my alimony payments. You don't hear me screaming about that when someone wants better articles in the magazine, do you?) I'll take it with a 68020, but I would really rather have a 68030. I mean, a real man wants a machine with a big processor. And if you don't use an '030, then don't come back to me in a year saying that I can't have this or that because "you need an '030." Really. Don't do that, even though the low-cost machine is going to cost under \$1000, and a color monitor won't make it that much more—or is that another wish? Now, in terms of storage...

3 1/2-INCH ERASABLE OPTICAL DRIVE

Hey. Surprise us. Do something that hasn't been done by everyone else. Buy the technology for 3 1/2-inch erasable drives and put it in all the machines. Awright! At least make it an option on the low-cost Mac. I know you can do this. I've had an erasable optical Jasmine 600MB monster on my desk for almost three months now. It's as reliable as a rock. And fast—the 30-millisecond access time competes with a hard

(continues)

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drive for speed. (I imagine John Belushi screaming "Are you listening?" and banging a 3 1/2-inch platter on the desk on "Weekend Update"). We deserve removable 200MB erasable optical disks. Mac users are cursed with a love of computing, so we should be allowed sufficient disk storage. It should also be available via an external SCSI drive in a chassis like the current floppy drive's.

4-MEGABIT RAM

And speaking of storage, a related topic, memory, comes to mind. Time to see Apple move ahead of the memory curve for a change. It's getting real old hearing the recurrent caveat: "Well, when the 4-megabit parts are available you'll be able to have XX megabytes in system memory." Wait, I've got it, Jean-Louis—tell John that it's a commodity issue. Packaging. Big bottles, little bottles. "The New Generation" thing. You know, if you ship bigger memory parts, the consumers will pay for them and not notice that they're paying more. Put another way, you need to design packages that make it easier for people to get more memory into the home. I'm sure research will tell you that there are few limits to the consumption of memory.

LIVE, FROM WORK, IT'S NTSC

I want to do two things with my Mac and my TV. I want to open a window on the Mac and have live video displayed in one corner. I want to have CNN playing throughout the day in a small window in another corner so I can watch for that story they're broadcasting about the new low-cost Mac. I suppose we will eventually wire *Macworld* with fiber optics. Then that same window will be able to deliver the equivalent of a picture phone, but until then I'll settle for live television without a lot of hassle.

The other thing I want to do with television technology is to use my Macintosh to edit and title videotape. Don't mistake my wish for a misdirected desire to turn the Mac into a VCR. I'll still need a VCR. But I want programs like Farallon's MacRecorder translated into the video realm so that I'll be able to run my Mac like a videotape editing machine: I want to

overlay graphics, text, and voice; edit; and produce a finished videotape to view on my VCR.

What's my wish? Video out and video in. Standard. No dealer handling. No preparation charges. Don't charge me for the transmission (and this wish does not constitute a Swiss Army knife) in my intellectual vehicle. Just give it to me.

PERIPHERALS FOR THE REST OF US

I want a color laser printer, under \$8000 (preferably under \$6000), with a good duty cycle (it won't clog, misfeed, wear out) that will have no problems printing anything that 32-bit QuickDraw can handle. Users should be able to choose black-only output from the print dialog box. Jean-Louis, a color laser printer would be like a beautiful woman going to war (Guy Kawasaki promised us this would work with you).

USER-DEFINABLE FINDER

There is already a great deal of talk about AppleScript, a scripting language that will become part of system software, so I probably don't need to wish for that. But a clarification is in order. Please don't make it another arcane, though slightly more accessible, programming language. Keep the scripting simple. One class of words, say, verbs, should represent actions. Another class of words, say, nouns, should represent objects. Grammatical rules would define the syntax. "Get and print Jerry's applelinks" should get and print my AppleLink messages. Make other functions parallel the English language as well. At the very least, a few of us would have to remember the distinction between a gerund and a participle. My God—computer teaches man. Plus, I could create neat icons on my desktop that would do things I actually want my computer to do. Provided I had the time, I could create agents of my own—Knowledge Navigator here today.

So congratulations all around on System 7.0. You've done more than most of us can appreciate. More important, you've put Apple back into a position of technical leadership. Now go do more good things. **M**

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MUSICAL NONET

Travels

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QUARTERLY REPORT ARTICULATE DESIGNS

• Second Quarter • 1990 •

The Second Quarter of 1990 saw Articulate Designs strengthening its position as the leader in marketing communications in the Bay Area. The most significant event was the completion of negotiations with the Oakland Rebels,^[1] a new football franchise, that will have Articulate Designs create the complete team image for the club—logo, uniforms, tickets, and marketing materials. The \$5 million deal calls for the consulting and design work into the mid-1990's.

The company posted profits of \$.15 per share this quarter, on \$244,568 of revenue, marking the third quarter in a row that profits have been increased. The acquisition of PeachTree Printing in the Fourth Quarter 1989 began to pay dividends, as the in-house production facilities are cutting costs in half.

Product Comparison Chart

FEATURE			
Text Wrapping	✓	No	No
Outlining	✓	No	No
Smart Search	✓	No	No

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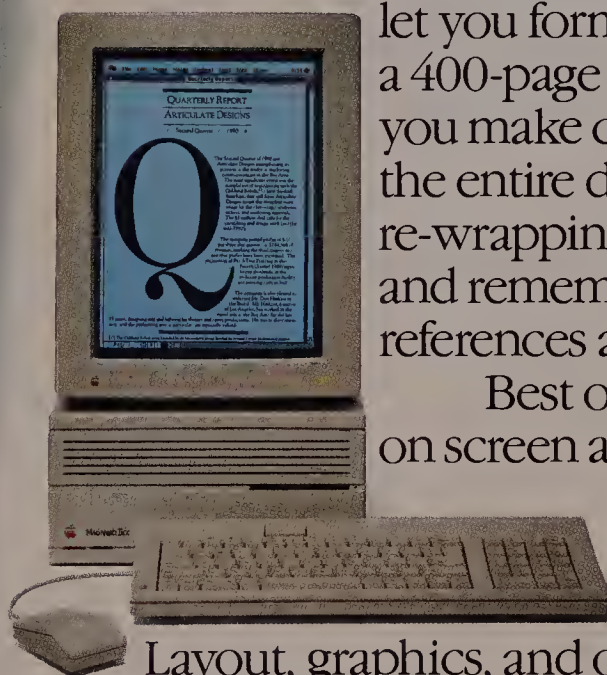
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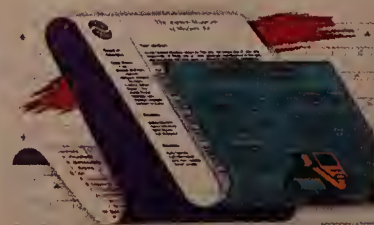
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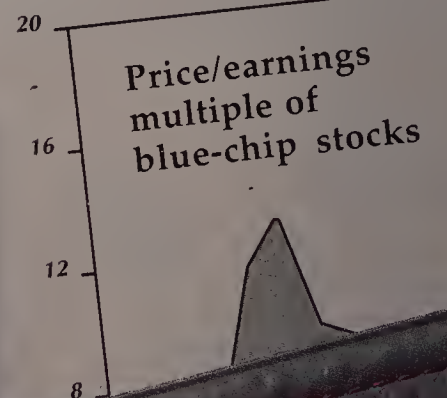
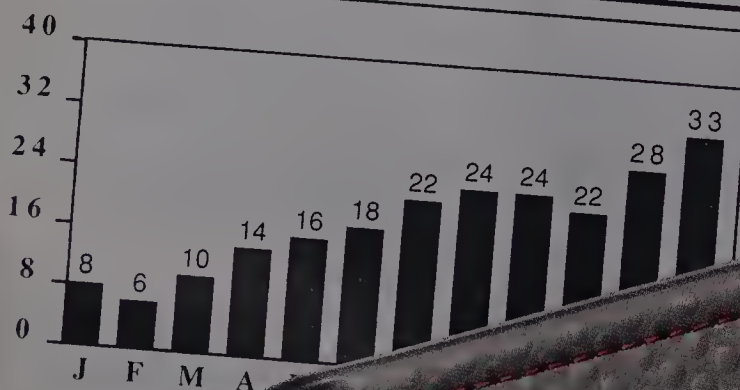
* In Colorado, call 303-799-4900, ext. 2100. Trademarks/Owner: FullWrite, Ashton-Tate, Ashton-Tate logo/Ashton-Tate Corporation; Macintosh/Apple Computer, Inc. © 1989 Ashton-Tate Corporation. All rights reserved.

WITH THE NUMBERS TO

Economic Review

THE MEDINA GROUP

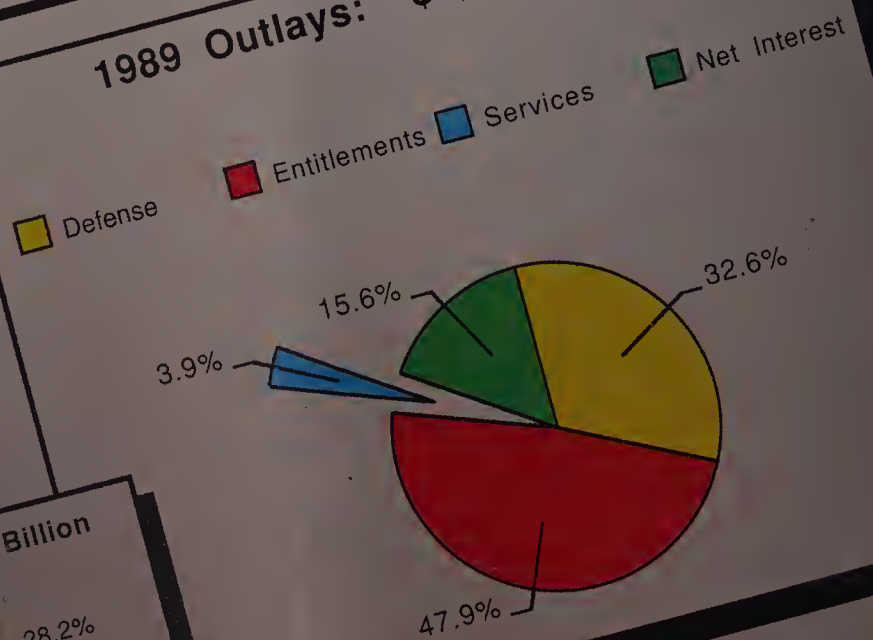
Summary of Results



As you can see by the accompanying chart, introducing new products is a key factor in our success.

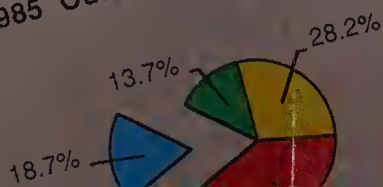
Close-Up on Government Spending

1989 Outlays: \$1,023 Billion



Entitlements have become increasingly burdensome as a percentage of total government outlays. As a result, funds for social services have been reduced.

1985 Outlays: \$946 Billion



Finance

	Annual Deficit	Addenda GNP
vs	-2.8	990.5
195.6	-23.1	1057.1
210.2	-23.4	1151.2
230.7	-14.9	1285.5
245.7	-6.2	1417.0
269.4	-53.2	1523.5
282.3	-73.7	1699.6
295.8	-53.6	1935.8
308.3		2173.4

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LETTERS

A forum for Macworld readers

The Apple Killer

We would like to remark upon a curious software bug in the new IBM "Apple Killer" system heralded in your April issue. The *Iconoclast* column has generated tremendous interest well in advance of the planned "official" product advertising. After all, a Macintosh-compatible IBM product offering more features than a Macintosh IIcx color system, all for under a suggested retail of \$1000. . .

MacFriends, the nation's leading Macintosh-only store, is heavily committed to the new machine. We ordered 250 initial units, with a standing order for 100 more each week over the first 90 days, which we will sell at 25 percent off list.

Our toll-free line is ringing off the hook with orders (thanks to your timely article). Even so, our steady supply is holding out nicely, and we can ship immediately most of the time. But there are a few problems. . . .

There's a funny bug in the Alarm Clock DA included in the system software. Even after you set the time and date, each power-up finds the clock reset to the default starting date, which is the same as the official product release date: April 1.

Checking with Microsoft,

we learned that something more sinister was afoot. A programmer with a secret loyalty to Apple deliberately did this and also fouled up the Notepad DA. The last page holds a message, which, like the April 1 date, cannot be erased. It reads, "April Fool! You bought me, and now you're stuck with me. You should have bought the real MACoy."

Now this is what we'd call a real April Fools' joke.

Ralph Owen
MacFriends
Portland, Oregon

It's Time to Move On

Just finished your exciting article on IBM's new Macintosh clone. I have been working with Macs for over three years but still don't own one. The truth is, I can't

afford to go that much into debt because of other priorities like house payments, food for the table, my wife's education. What a great feeling it was to discover that someone was finally about to produce a Macintosh-type computer that the average person could afford. Come April 1st, I am going to buy one of those IBM computers, which will require me to start a subscription to a magazine that covers IBM computers. I won't need to read about Macintoshes anymore, so please cancel my subscription to *Macworld* as of April 1, 1989. Sorry about this; I was very happy with your magazine, but I won't be needing it any longer.

Robert Finley
Seattle, Washington



Corrections

Crate Technology's MacCrate 80MB hard disk ("Massive Media," June 1989) retails for \$949 and weighs 8 pounds.

CaptGen (Macworld News, June 1989) is a video character generator by Mikrologix Software (Tucson, Arizona, 602/325-8794).

HyperAnimation is a registered trademark of BrightStar Technology ("Move It!," June 1989).

Is Microsoft Listening?

Bravo. It's been a long time since I've been taken in as fully by an April Fools' joke. I was so excited. I read and reread the article. I knew it sounded too good to be true. But did that matter? Noooooo. I wanted this new machine. I could see where it would fit. I was planning on selling my SE and buying three or four of these clones. Why not? It was such a terrific deal. I admit I'm disappointed, but maybe, just maybe Bill Gates has read the article too. If you did, Bill, how about it?

Robert E. Pennington III
address unknown

There's Something Unreal about This

As one who is still on the fence, undecided about whether to go the Mac or PC (continues)

route, I found your announcement of IBM's Mac clone welcome news. Now, perhaps the combination of the Mac's widely vaunted user-friendliness and IBM's reliability will give us the best of both worlds.

I can only wonder how your advertising department failed to get a splashy gatefold from IBM to officially announce this stunning development. Without it, your story still seems unreal.

Or is it a joke? April. . . I get it. Their lawyers will be in touch.

Walt Lankenau
Blairstown, New Jersey

Believing the Unbelievable

On March 20, I received a call from our community development consultant, who is, like me, a dedicated Mac

user. He had just received the April issue of *Macworld* and told me to read the article by Steven Levy, "Introducing the First Mac Clone."

I grabbed the magazine, tore off the plastic, and quickly found the article. I couldn't believe my eyes. A Mac clone with more power and memory than a Mac II, with built-in software and color monitor and fax and 2400-baud modem, for a quarter of the price of a Mac II! This was amazing.

I decided to call IBM to check this out. A pleasant-sounding woman answered the phone. "I just read that IBM has developed a Mac clone," I told her.

"Did you read this in *Macworld*?" she inquired.

"Why, yes."

"It's a joke."

Her words knocked me as cold as would a Tyson uppercut.

I quickly called our community development consultant. "How can they do that?" he asked. "They even printed Bill Gates's name. And IBM. It's supposed to be shipped April 1st." April 1st. Suddenly it dawned on him. He repeated those two words again. Finally I realized it too. What a fantastic April Fools' Day prank. I should've known better.

Well, Steven Levy, I owe you one.

William J. Coleman
Scranton, Pennsylvania

Pixelmaster and Scanmaster

I'd like to clarify a few points in your April issue. First, in

your *Commentary* on the Macworld Expo, you listed our solid ink-jet printer, the Pixelmaster, as a \$9000 thermal jet printer. The Pixelmaster actually lists for \$7690. Second, in Bruce Webster's review of color scanners [Reviews], our Scanmaster is listed at \$8195, while Sharp's JX450 is \$6995. Our price includes the National Instruments (not National Semiconductor) GPIB board, cable, and Scan-It software, while the price of the JX450 does not.

Edward J. Marino
Howtek Inc.
Hudson, New Hampshire

The price we listed for the Pixelmaster was correct when the column was written; unfortunately, we were not informed of the change.—Ed.
(continues)

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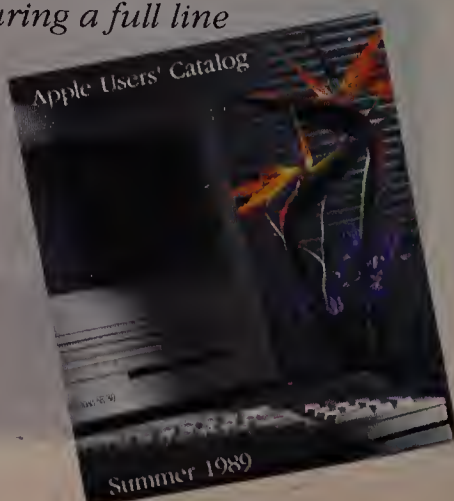


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*Partial list

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Unlocking the Mysteries of RAM

While reading the March issue, I came upon several inconsistencies. Thom Hogan's excellent article, "Pondering Performance" [*State of the Mac*], really helps neophytes like me understand many Mac concepts. However, he states that the SE has 120ns RAM and that virtually all software accesses SANE and not the coprocessor directly.

Bruce Webster's article about processors ["Processors: Is Faster Better?"] was very interesting but a bit confusing (especially regarding RAM requirements). He says the SE has 150ns RAM and that most manufacturers access the coprocessor in their applications.

Both articles mention RAM speed, clock speed, and wait

states. Will faster RAM actually speed up performance?

Russ D. Granich

San Francisco, California

First, the SE requires 150ns access time or faster. At one time, SEs were shipping with 120ns RAM, which led to the confusion. The SE/30, by the way, requires 120ns RAM. Second, before the MPW system recently started supporting direct 68881 calls, very few programs avoided SANE. Finally, faster RAM has no effect on system speed—the CPU/HMMU imposes a wait state on all RAM regardless of how fast the CPU/HMMU can respond.—Ed.

Pondering Obsolescence

I have a couple of comments on "Pondering Performance" [*State of the Mac*, March 1989]. The 68020 and the 68030 chips I've worked with had 256 bytes of cache memory, not the 128 bits stated in the article. Either somebody made

a goof or you have found a very strange variant of the 68020/030.

The second comment is, aren't we becoming a bit jaded about small computers? I have often commented that the half-life of digital technology is about five years, but to complain that a two-year-old machine is obsolete seems a bit much.

Everett M. Greene

Ridgecrest, California

Yes, the 020/030 chips do have 256 bytes of cache memory. The original reference was to the cache's being loaded 128 bits at a time; it somehow got shortened into "128-bit cache."

As to the life cycle of equipment, it's only been in the last year that Mac software has really coalesced into mature, professional-caliber tools, and it is with that software that the Mac II shows its age.—Ed.

A/UX with a Friendly Face

In the sidebar, "A/UX version 1.1" ["The Mac SE Turns 030," March 1989], you say there is no Finder-like interface for A/UX applications. InterfaceR, developed by List SpA, offers Mac-style access to UNIX services and files. It is bundled by Apple Computer Italy with every A/UX sold in Italy, and it is distributed all over Europe, Canada, Japan, China, and the Far East. In the United States it is distributed by Bonsu.

Jean-Claude Morel

List SpA

Pisa, Italy

Bonsu tells us InterfaceR has not been publicized here, as it has been abroad, but it can be ordered from Apple dealers and other computer stores. We apologize for overlooking it.—Ed. (continues)

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John Lewis—Editor MacTimes UK

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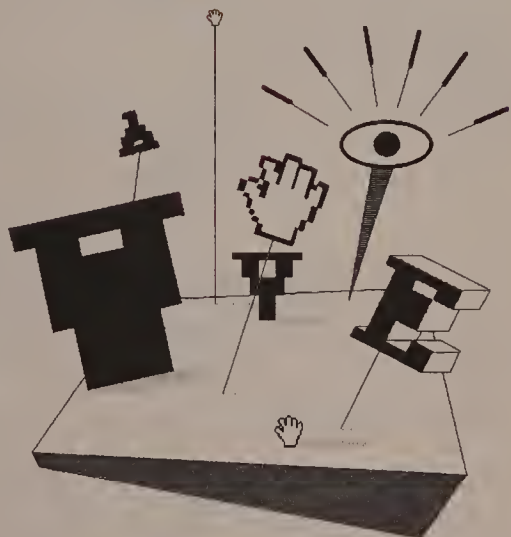
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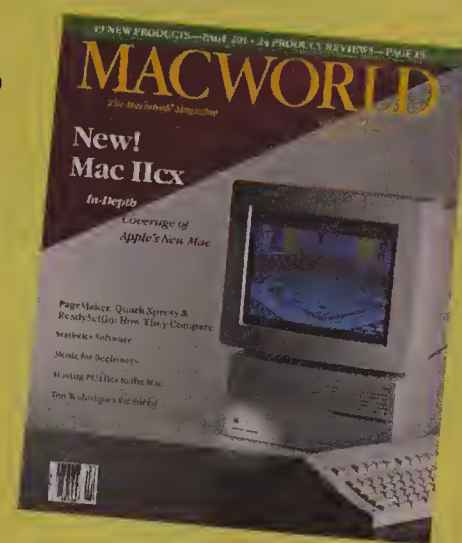
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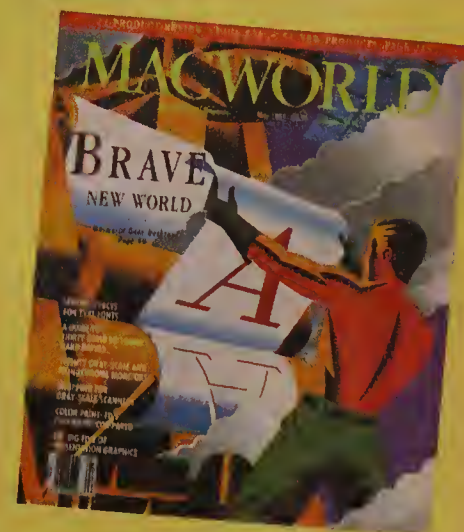
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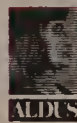
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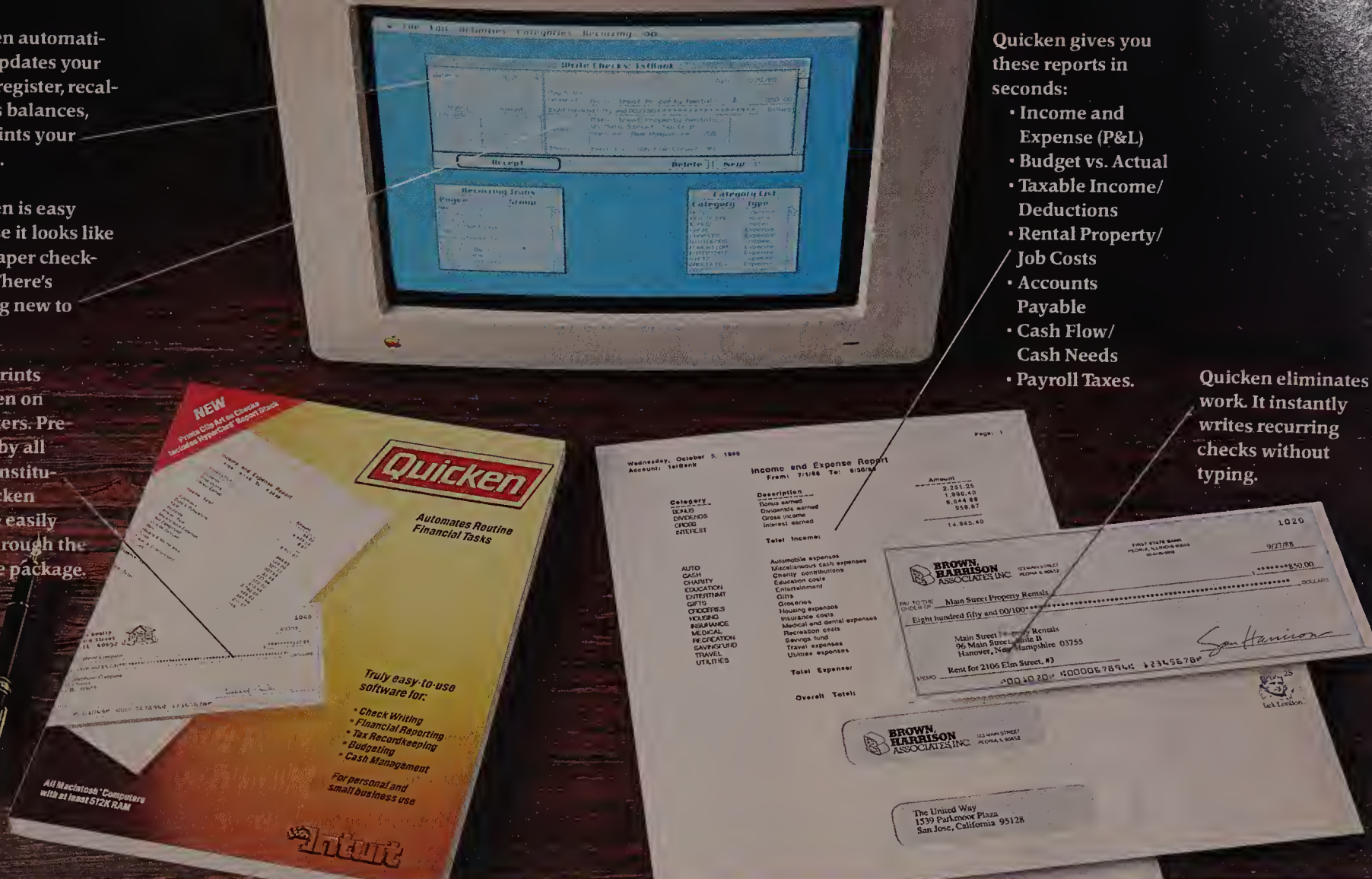
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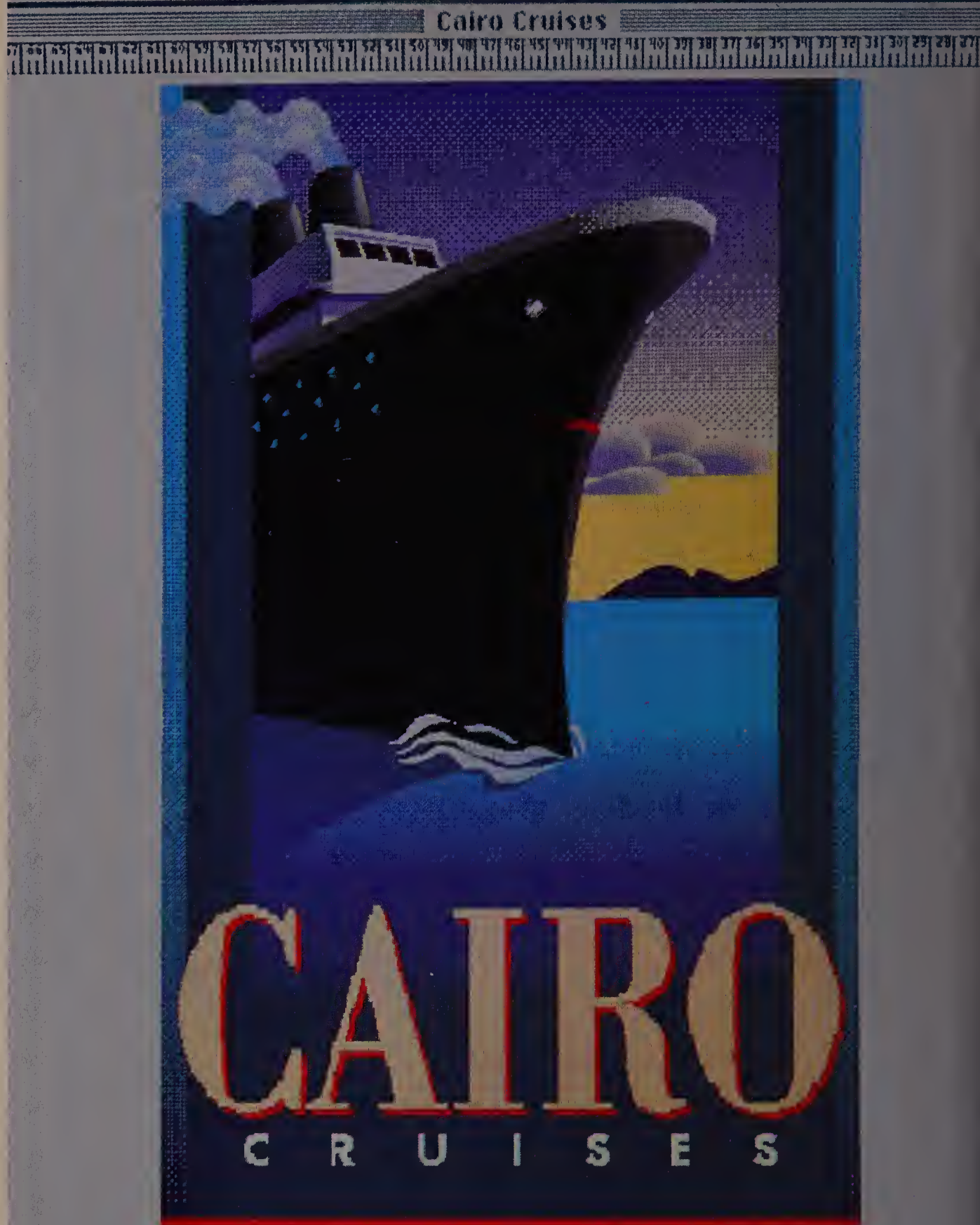


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Computers R Us

Liza Weiman was way off base with her review of Alphabet Blocks by Bright Star [Reviews, February 1989]. Comparing it to Reader Rabbit was like comparing apples to oranges. My four-year-old daughter enjoys both programs, but for different reasons. The secret to Alphabet Blocks is the phonics, something my little girl is very interested in. She knows this is the code to break if she wants to read, and she can't learn phonics from Reader Rabbit. Alphabet Blocks' questions, reinforcing Elf, letter identification, matching book, and use of the keyboard are more than enough to keep her attention.

Suggesting parents buy wooden alphabet blocks

instead of this software was the height of irrelevance. The attraction for children is *the computer*. Your trashing of a successful program was simply poor reporting.

Bob Solum

Lynnwood, Washington

Changing Fonts in Scanned Text

I recently bought an Apple scanner and was wondering if any of the OCR software reviewed in the February 1989 issue of *Macworld* ["The Reading Edge"] allow you to change the fonts once the text is placed in a PICT, MacPaint, or TIFF file. If not, what would be the easiest way to change the font after scanning?

N. Calvin Han

Los Angeles, California

You won't be able to alter the font in the scanned text (MacPoint, TIFF, PICT, and so on) while it's a bitmapped graphic. You can change fonts in the conventional way (in your word processor) after the scanned image been converted to text via OCR software.—Ed.

A Fax Modem Fan

I couldn't believe my eyes when I read Dave Kosiur's article "Mac Fax: Not Ready for Prime Time" [March 1989]. I bought my first Mac because as a small-business owner I found computing the best way to take care of all the paper that was piling up on my desk.

I concede that the addition of a scanner could eventually put the price of my unit slightly above that of a stand-alone fax unit. But if I were to follow Kosiur's advice, my desk would look like it did before I bought my Mac. Instead, with

my fax modem, all the paper that's coming in through the phone lines stays inside my Mac where it belongs.

I wouldn't trade my fax modem for anything, and I think a lot of your readers would feel the same. So, come on, in all fairness, let's give the fax modem a little more credit.

Sam Edwards

Brooklyn, New York

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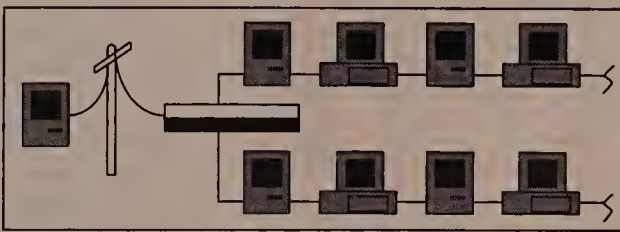
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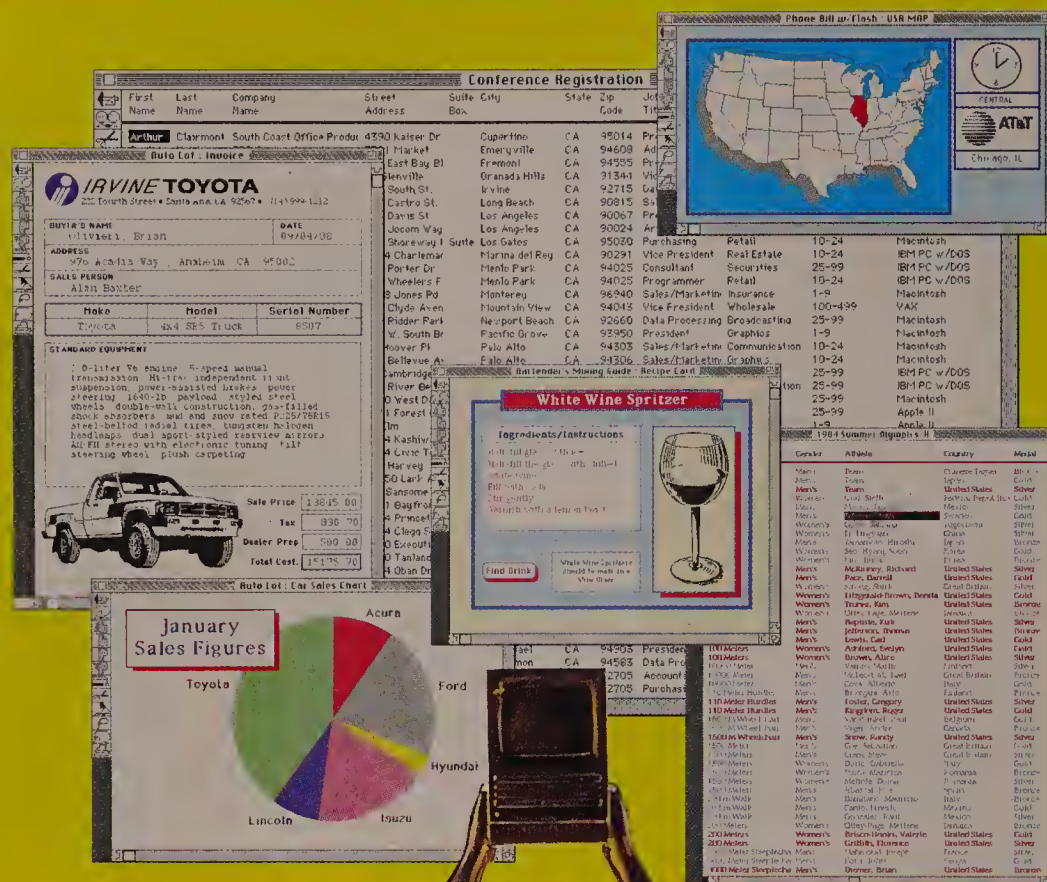
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ART BEAT

by Deborah Branscum

This column examines the tools and the talent behind Macworld's graphics and discusses the techniques that make them possible.



Artist: Max Seabaugh has been a graphic designer for 20 years.

Tools: Macintosh II, AppleScanner, Adobe Illustrator 88.

How It Was Done: The opening art for our feature on system software 7.0 began as a felt-tip-pen drawing on tissue paper. Once the rough drawing was approved, Seabaugh scanned it into his Mac II with an AppleScanner. He saved the file as a MacPaint document and then opened it within Illustrator 88.

The bitmapped image from the scanner stays in the background and can't be manipulated. "The sketch becomes a basis to work from," says Seabaugh. "It's exactly like using tracing paper." The artist uses the pen tool to trace, change, and improve on the initial drawing, and groups objects and

colors them as he draws.

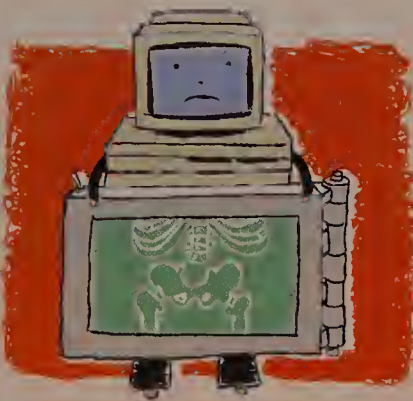
Seabaugh worked with cut paper before he began using a computer. "Illustrator can create the same effect as cut paper: shapes made of color lying on top of one another," he says. "And it can be done easily and quickly."


Artist: Ward Schumaker designed several corporate magazines before moving to illustration.

Tools: Mac Plus with 20MB hard drive, AppleScanner, MacPaint.

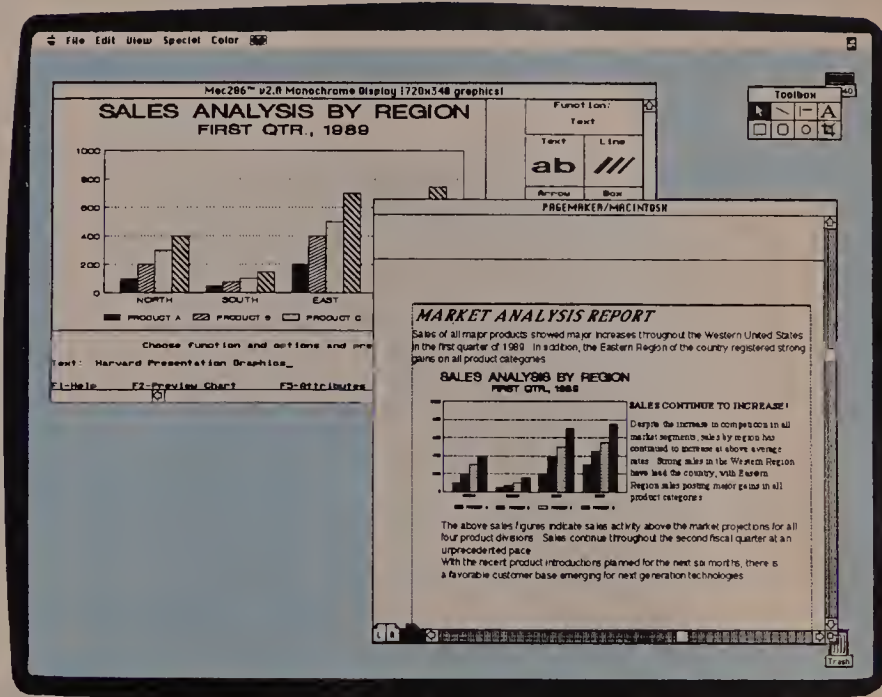
How It Was Done: Schumaker, a computer novice, was asked to use a Mac for *Getting Started*. He drew the sketch by hand, scanned in the image, then cleaned it up on screen. He used the mouse to "scribble" the background.

The illustration took two days, including concept,



changes, and fine-tuning. "If I had done this in ink and they'd asked for changes, the changes would have taken two hours," he says. "On the computer, it took 15 minutes." 

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Access for All

Powerless hands,
meet the computer

by Steven Levy

Normally I seek the future's cutting edge in Silicon Valley, most often within demo rooms and programmers' cubicles. But while technology marches on (insensitive to its own indelible impact), there is another movement, no less important. I am referring to the movement to assure that technology will work for human beings and not against them, that it will work for the good of a unified society and not aggravate an already splintered community. While many silicon-based dreams will come true (after all, one day someone *will* come up with a cheap flat-screen monitor), success in this other movement is by no means assured. Yet those in the front lines are determined—and surprisingly optimistic.

To share their views with you, I rode the subway to East Harlem, to the basement of a housing project. Within a cluster of rooms with institutional trappings is a garden of about 40 computers—IBM PCs, Apple IIs, Macs. This is where the Playing to Win (PTW) project each week serves 500 members who otherwise would have little or no access to computers. PTW is a model for the community computing movement, which begs and borrows equipment and grants so that blacks,

Hispanics, disabled people, and women can gain a footing in the new world so easily inhabited by white males.

Antonia Stone, PTW's founder, gives me a brief tour of this facility and then invokes the gospel. "The problem," she says, "is that computers could be another divisive element in a

society that already has divisive elements." The irony is that computers also have the potential to do the reverse, to empower the powerless—if only the powerless could get their hands on them. So eight years ago Stone vowed to change things. Powerless hands, meet the computer.

On a very small scale this happens at Playing to Win (which, incidentally,

receives no government funds). Stone shows me a weekly schedule—all the time slots are filled with a mixture of classes from neighboring public schools, adult literacy programs, vocational and rehabilitation groups, Head Start classes, and open hours where any East Harlem resident can use the computers for a nominal sum. Trained counselors are on hand to help novices. Stacks of software, much of it donated by publishers, are available. The most popular machines, naturally, are the two Macintoshes, gifts from Apple Computer; both have long sign-up lists. Since one of the Macs is equipped with a LaserWriter, PTW can offer desktop publishing services to its members, as well as to local nonprofit groups.

This is all well and good. But let's be realistic here. The problem can't be solved in a Harlem basement. To quote Stone herself, "We serve 500 people, which seems like a lot, but it's not even a drop in the bucket." The fact is, folks, that in this fine land of ours computer access is about as equitably distributed as, say, money. While a certain segment of America has become so comfortable with computers that it has lost the ability to imagine what life was like without that power, other segments still regard the machines with a mixture of distrust and longing.

A FACE IN THE CROWD

And then there is the computer industry itself. Not exactly a picture of equal access and integration. I chanced to scan the audience during a lull at one of the crowded Macworld Expo keynote sessions last January. Of a thousand faces, perhaps two or three were black. The closest thing to soul you see at an Expo is the Yuppie-Motown bands that play the parties. Stone notes that this imbalance is the rule rather than the exception, and when speaking at these events she calls attention to it. Stone hopes one day she won't have to.

So does Santiago Rodriguez. Formerly the affirmative action officer at Stanford University, last year he signed on as head of Apple Computer's newly titled Office for Multicultural Programs. As he outlined the innovative ideas coming from his office, Rodriguez demonstrated a quick (*continues*)



mastery of Apple-speak. But beneath the jargon, I heard common sense.

"Think of diversity as a value-added perspective in everything we do," he says, explaining why Apple sees its efforts to more fully integrate its work force as not only a responsibility but a good business move. "If you limit talent artificially, you don't get full value. We have an incredible self-interest in doing the right thing."

He admits that Apple has been slow in

recognizing this need. "Someone asked me what our biggest problem [in realizing diversity] was," Rodriguez says. "My answer was that a lot of people don't think there *is* a problem." This attitude is typical of many in the computer industry who don't realize that extra steps must be taken to include those who might be excluded by business as usual. "One reason our work force is so white is that it grew so fast," Rodriguez says. "We hired by word

of mouth and networks, and the people tended to be upper-middle-class whites."

To address this problem, Rodriguez not only uses traditional affirmative action tactics but also creates programs within Apple to remove subtle impedances within the corporate culture that might otherwise keep minorities off the fast track.

CENTERS OF POWER

Rodriguez is confident that Apple will attain the diversity it seeks. But the problem, of course, goes much deeper. We need to level the playing field early on. That is where the Well-Meaning Dream comes in: empower a generation of deprived kids with school programs and community centers like Playing to Win.

Again, the makers of the Macintosh are doing the honorable thing. I talked to Fred Silverman, who manages Apple's Community Affairs group. "We feel very committed to helping people who don't have access to the technology get access to it," he says, also obviously proficient in presenting the official story. "People developing their potential is part of the reason for Apple Computer." Besides donating about \$1 million worth of equipment a year to schools, Silverman's group doles out computers to 150 learning centers in 34 states. If by introducing talented youngsters to computers these gifts eventually help integrate the industry, "it would be a wonderful result of our efforts," says Silverman.

THE LUCKY FEW

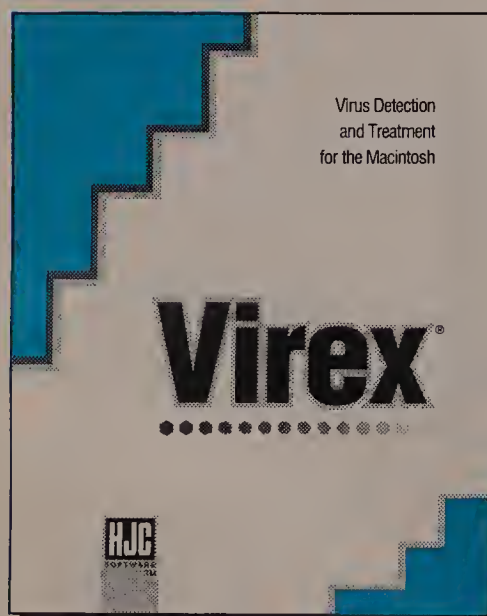
More immediately, these computer centers are helping certain individuals reap dividends from computing *now*. For instance, in the Computers and You program, run from the Glide Memorial Church in San Francisco, three groups benefit from the bevy of Apple II GSs and Macintoshes on hand. Preschoolers get early exposure to hands-on stuff like Logo. Students in after-school programs use computers to diagnose areas of academic weakness. And adults become familiar with computers and learn applications to help them in the work force.

But as we have seen, these folks are drops in the bucket. The problem is the *(continues)*

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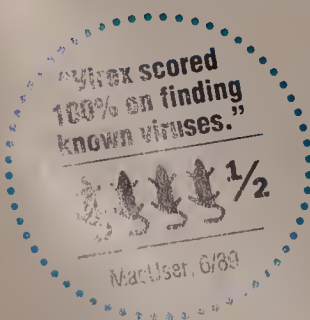
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Virex—our users tell us its a great product.

Virex, the premier anti-virus solution for the Macintosh both **detects** viruses and **repairs** infected files, disks and servers. Virex combats all known Macintosh viruses including nVIR, Scores, INIT29, Hpat, ANTI and MEV#. And Virex is promptly updated when new viruses occur. Registered users may purchase individual updates or subscribe to an inexpensive annual update service. Site licensing programs are also available.



HJC Software, Inc.

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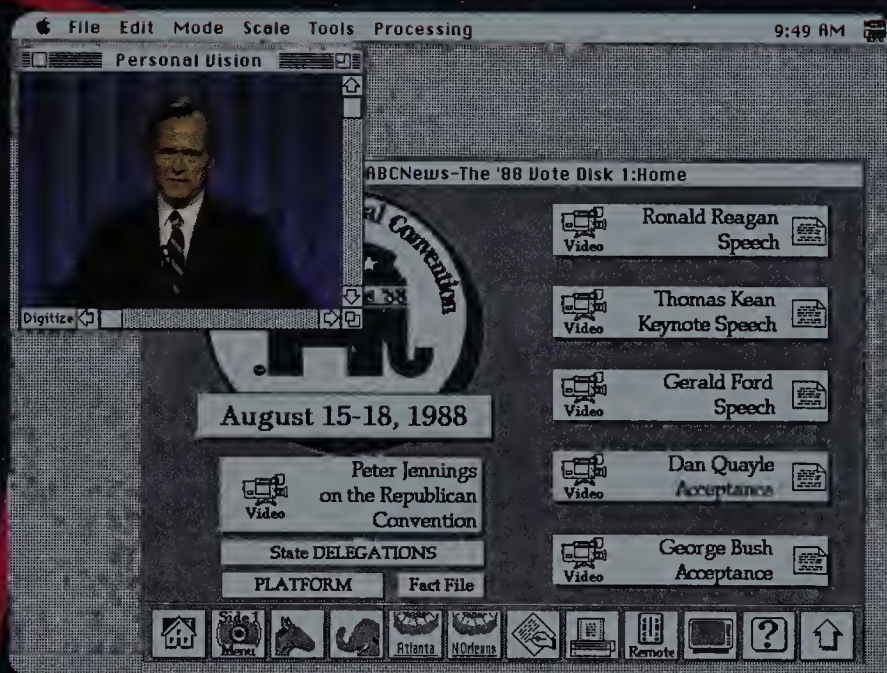
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Live color images can be displayed, captured, and enhanced from any video source including camcorders, VCRs and laser disks.

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Imagine importing live video from a variety of sources directly into a window on your Macintosh II. Personal Vision™, the new video digitizer card also known as PV™, integrates video with the text and graphics of your favorite desktop publishing or presentation program. The "film clip" can also be interactive video managed through an expanded HyperCard™ or SuperCard™ stack.

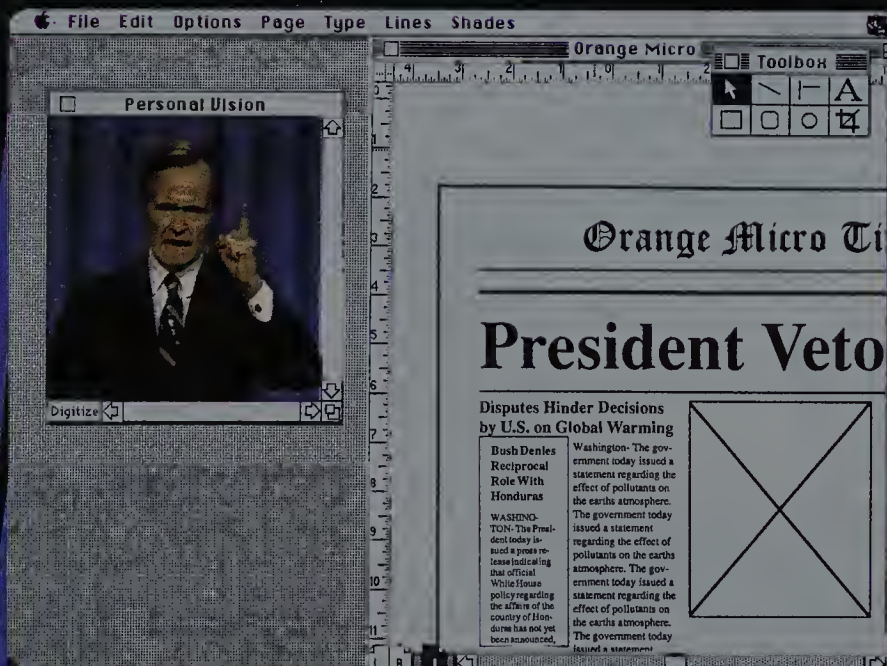
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Programs Plus



Nisus by Paragon Concepts

With **Nisus**, word processing takes a dramatic new direction. Only **Nisus** has unlimited undos, graphics within text, recordable macros, Easy Grep, effortless indexing, editable page preview, on-screen line numbers, intelligent spell checking, plus all the search and replace power of QUED/M. And it's not just for super-users — **Nisus** needs only a Mac Plus or larger. **\$259.**

MODEMS

Abaton InterFax 12/48	325.	MacCompack (2400SA w/Microphone & Cable)	225.
Anchor Automation MacPac 2400E w/software & cable	179.	Prometheus Promodem 2400M Ext. (Software & Cable)	199.
Best Data Products SmartOne 2400/1200		Promodem 2400SE Int. Special	199.
w/software & cable	Special 169.	Promodem 2400MII (II, IIX, IICX)	269.
CMS CMS 2400BMX	179.	Supra Corporation Supra Modem 2400	149.
Hayes Microcomputing Smartmodem 1200	295.	U.S. Robotics Courier 1200 (Hayes Compatible)	199.
Smartmodem 2400M w/smartcom II	499.	Courier 2400 (Hayes Compatible)	349.
Practical Peripherals Practical Modem Mini 1200SA	77.	Ven-tel Mac2400E (Int. Mac II w/MS Works)	369.
Practical Modem 2400SA	179.		



Puzzle Gallery by Miles Computing

Puzzle Gallery: At the Carnival. The author of *The Fool's Errand* brings you 40 attractions stuffed with 180 challenging new puzzles, complete with 58 different digitized sounds and Mac II color. Can you survive Hazard Park? **\$32.**

NETWORKING SOFTWARE & HARDWARE

CE Software Quick Mail 1-10 users 2.0	259.	Shiva NetModem V2400	479.
Farrallon PhoneNET AppleTalk	9.	Net Serial X232	289.
PhoneNET Din 8 or DB9	35.	Net Bridge or TeleBridge	349.
Timbuktu	65.	TOPS Tops 2.1 Mac	Special 149.
TrafficWatch	139.	Tops Dos or Net Print	119.
Timbuktu Remote	195.	Tops FlashBox	Special 125.
LaCie Silverserver	89.	Tops Repeater	129.
Magnus FileMagic	65.	Tops FlashCard	169.
Microsoft Microsoft Mail 1-4 users	195.	InBox-MacConnection	45.
Olduvai Software Clip Share	109.	InBox-Starter Kit	Special 149.
Font Sharer	149.	Tops Teleconnector Din8 or DB9	39.



GOfer by Microlytics, Inc.

GOfer is the ultimate desk accessory for finding hidden facts. Give **GOfer** a phrase, fact or date and send him looking through floppies, hard disks, ram disks and most networks. Search for up to eight items simultaneously. **GOfer** allows you to view, cut and paste. Multifinder and Hypercard compatible plus AND, OR, NOT and Nearby search criteria. **GOfer** a real find. **\$43.**

PRINTERS & DIGITIZERS

Digital Vision Computer Eyes-Mac	209.	LogiTech ScanMan	Special 349.
Koala Technologies Corp. MacVision 2.0 (Digitizer)	219.	Seikosha SP1000 (Imagewriter comp.)	235.
Mac Director	109.	Summagraphics Bit Pad Plus	325.
Kurta IS ADB Tablet	255.	ThunderWare ThunderScan	189.
Cordless 4 Button Cursor	65.	LightningScan	409.
		Mac II Power Accessory	42.



ProModem 2400SE by Prometheus

NEW! The **ProModem 2400SE**, an internal, 2400 baud modem for the Macintosh SE or SE/30. The 2400SE can be upgraded with MNP error correction and data compression. Includes modem and MACKNOWLEDGE communications software. **\$199.**

EDUCATIONAL/CREATIVE SOFTWARE

Ars Nova Practica Musica 2.1	75.	Electronic Arts Mavis Beacon Typing	33.
Barron's Barron's SAT	35.	Deluxe Music Construction Set V2.5	84.
Bogas Productions String Quartet, Country or Heavy Metal	14.	First Byte Dinosaur Discovery Kit, Puzzle	
Bright Star Technology Super Studio Session	69.	Storybook or Rhyming NoteBook	27.
Alphabet Blocks	32.	Great Wave Software KidsTime	26.
Talking Tiles	69.	Number Maze	27.
Broderbund Sensei Geometry, Calculus or Physics	59.	Crystal Paint	27.
Type!	20.	Individual Typing Instructor Encore	26.
Where in the World is Carmen SanDiego?	27.	Learning Company Reader Rabbit	32.
Where in the USA is Carmen SanDiego?	32.	Mindscape Perfect Score SAT	
Coda Mac Drums	31.	w/The Perfect College	46.
Perceive	51.	Niles & Associates End Note	82.
Davidson & Associates Speed Reader II	36.	Nordic MacKids Educational Prog. (ea)	28.
Math Blaster or Word Attack!	27.	Simon & Schuster Typing Tutor IV	35.
		Springboard Top Honors	59.
		Family Matters or Atlas Explorer	28.



DiskFit 1.5 by SuperMac Software

Now there is no excuse for not protecting the information on your hard disk! Quickly and automatically, **DiskFit** performs an incremental back-up of your hard drive onto standard or high-density floppies, cartridges, tape or other hard drives. Allows you to select the type of files for back-up and finder-readable storage format lets you copy single files from the back-up media in the Finder. **\$53.**

BUSINESS SOFTWARE

Abacus Concepts StatView II (Mac+, SE, II w/68020 & 68881)	299.	Nolo Press WillMaker 3.0	32.
StatView SE+ Graphics	225.	For the Record	29.
A.E.C. FastTrack Schedule	Special 115.	Paracomp Milo	159.
Ashton Tate Full Impact	249.	Power Up Fast Forms	89.
BrainPower ArchiText	175.	Pro Plus WallStreet Investor V3.0	469.
Chang Laboratories C.A.T. MacCalc	Special 229.	Satori Software Bulk Mailer 3.2	
Claris MacProject II	379.	Bulk Mailer Plus	Special 189.
Smartform Designer	309.	Select Micro Systems, Inc. Exstatix	215.
Individual 101 Macros For Excel	37.	MapMaker	215.
Mainstay Capture	39.	SoftView MacInUse	42.
Mac Flow 3.0	125.	Form Set Business Forms	55.
Mac Schedule	115.	Synex Mac Envelope 4.10	Special 55.
Meta Software MetaDesign	199.	Mac Invoice	29.
Micro Planning International Micro Planner 6.0	325.	Systat Systat 3.2	
Microsoft Microsoft Works 2.0	189.	(Specify MacPlus, SE or Mac II)	459.
Microsoft Excel 1.5	255.	Fastat	Special 165.

Overnight \$3



Simply Accounting by Bedford Software

Simply Accounting, for small to medium size businesses, is sophisticated enough to please CPA's but simple enough to allow accounting and computer neophytes the power of a full accounting program. Includes general ledger, accounts payable, accounts receivable, payroll (50 state and federal tax schedules built-in), inventory and jobcost. It received a 7.9 rating from Infoworld and four mice from MacUser. **\$219.**

DESK ACCESSORY PROGRAMS

Affinity Microsystems		Jam Software	
Tempo II	89.	Smart Alarms w/ Appt. Diary	65.
Affinifile	45.	Multi-User Appt. Diary w/ Smart Alarms	119.
Casady & Greene, Inc		Mainstay Think'n Time	59.
QuickDex 1.4A	32.	Solutions, International	
CE Software DiskTop	32.	Super Glue	49.
Deneba Software		SmartScrap & The Clipper V2.0	46.
Comment 2.0	62.	Symmetry HyperDA (Req. 512K)	35.



MAC-101 Keyboard by DataDesk

Replace your Mac's keyboard with the **MAC-101** by DataDesk. The positive tactile, firm feel 101 includes a full numeric keypad, 15 function keys, 6 page control keys, and a T-style cursor pad. Includes 101-Keys desk accessory software, a powerful macro utility that allows you to exploit the full power of the function keys in almost any Mac application. Available in ADB and non-ADB versions. **\$145.**

SPELLING & GRAMMAR CHECKERS

Aegis Development		Microlytics, Inc.	
Doug Clapp's Word Tools 2nd Edition	42.	Word Finder (Synonym Finder)	33.
Deneba Software Big Thesaurus	62.	Electronic Word Finder	79.
Spelling Coach 3.0 Professional	119.	Sensible Software	
Electronic Arts Thunder! II	52.	Sensible Grammar or BookEnds	53.
Lundeen & Associates		Working Software	
WorksPlus Spell	46.	Spellswell 2.0	45.



FileGuard by ASD Software

FileGuard is the automatic file protection program that provides a comprehensive solution to all your problems of security and confidentiality. This integrated software will enable the user to easily encrypt and decrypt documents for protection against unauthorized access. **FileGuard** is so transparent that it will not alter the habits of Macintosh users in any way. **\$129.**

UTILITY SOFTWARE

Abbott Systems, Inc. CanOpener	79.	MainStay AntiToxin or ClickPaste	65.
ALSoft Master Juggler	64.	Microlytics, Inc. GOfer	Special 43.
MultiDisk	49.	Microseeds INITPicker	29.
Disk Express	49.	Redux	55.
Font/DA Juggler Plus	42.	ScreenGems	45.
A.S.D. FileGuard	Special 129.	Olduvai Software Icon-It!	45.
Berkeley System Design		MultiClip	55.
Stepping Out II	52.	Read-It! O.C.R. Personal	109.
Beyond Inc. Menu Fonts 2	28.	Read-It! O.C.R. 2.0	245.
Central Point Software		PCPC HFS Back-Up 3.0	54.
Copy II Mac (Includes MacTools)	20.	SuperMac Software	
PC Tools Deluxe Mac	42.	SuperSpool 5.0	53.
CE Software		SuperLaserSpool 2.0	79.
QuickKeys (Macro Program)	69.	Diskfit 1.5	Special 53.
MockPackage Plus Utilities	32.	Sentinel 2.0	89.
Farallon Computing Screen Recorder	133.	Symantec MacSQZ!	52.
Fifth Generation Systems		Symantec Utilities for Mac (S.U.M.)	69.
Suitcase II	45.	Symantec AntiVirus for Mac (S.A.M.)	69.
FastBack II	119.	Williams & Macias	
Power Station	35.	DiskFinder	Special 27.
Pyro!	15.	myDiskLabeler w/Color	29.
HJC Virex	69.	myDiskLabeler	
Icom Simulations On Cue	35.	w/ LaserWriter Option	Special 34.
Insight Development		StickyBusiness	Special 99.
MacPrint	Special 79.	XTree Company XTree	55.



ScanMan Hand-Held Scanner by Logitech

Add images up to 4" wide to your documents fast and easily with **ScanMan**. Set scanning resolution from 100-400 dpi. Handy desk accessory software for scanning and editing your images. **\$349.**

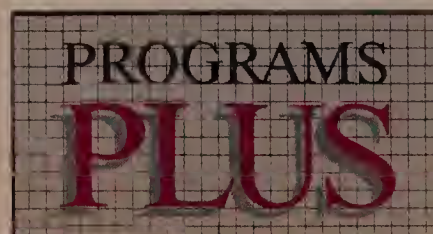
DATABASE MANAGEMENT

Acius 4th Dimension	Special 385.	Generation Four	
Activision		Multiuser Business	
Reports for Hypercard	69.	Administration Series (each)	115.
Focal Point & Business Class Bundle	49.	Microsoft Microsoft File 2.0	129.
Apple Computer		Odesta Double Helix II	339.
HyperCard	42.	DataDesk Professional	285.
Borland Reflex Plus	189.	GeoQuery	199.
Claris		Preferred Publishers	
FileMaker II	229.	DAtabase	75.
Fox Software FoxBase+	205.	ProVUE Panorama	205.
FoxBase+ Multi-User	315.	Software Discoveries	
FoxBase+ Runtime	155.	RecordHolderPlus	65.



Cutting Edge 800K Drive by Cutting Edge

The **Cutting Edge 800K** floppy disk drive takes advantage of the newest technology to offer high speed, low noise, high reliability in a compact, stylish case. The **Cutting Edge 800K** floppy drive is compatible with all new ROM Macs including the Mac SE and Mac II. The **Cutting Edge 800K** would make an attractive addition to many Macs. **\$149.**



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Programs Plus



MacPlot by Micro Spot

If you work with CAD, desktop presentations or business graphics then using a plotter and **MacPlot** will add a whole new dimension to your work. **MacPlot** has made plotting as easy as using an ImageWriter or LaserWriter. Print directly from within any application using the 'page setup' and 'print' commands from the 'file' menu. Easy and user friendly, **MacPlot** now supports more software packages and more plotters than ever.

ACCOUNTING PACKAGES

Aatrix Software		Layered Insight One Write	125.
Aatrix TimeMinder	159.	At Once!	Special 295.
Aatrix Payroll Plus	159.	Insight Expert INV or	
Bedford Software		Time Billing	Special 409.
Simply Accounting	Special 219.	Insight Expert GL, AR, or AP	Special 409.
Chang Labs		MECA Managing Your Money	127.
Rags to Riches Gen. 3-Pak 3.1		Monogram	
(GL/AR/AP)	289.	Business Sense	Special 279.
Rags to Riches GL, AR, or AP	119.	Dollars & Sense 4.0	81.
Check Mark MultiLedger	259.	Peachtree	
Payroll	189.	Back To Basics Professional	
Cash Ledger	129.	(GL/AR/AP/INV)	159.
Dac Software		Satori Software Components GL	369.
Dac-Easy Light	42.	Survivor Software	
Intuit Quicken	32.	MacMoney 3.0 (Enhanced Ver.)	61.

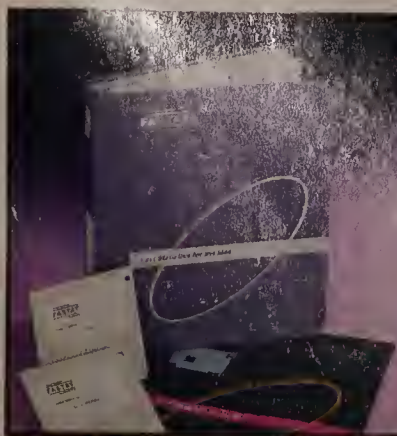


atOnce! by Layered Inc.

atOnce! is the next generation in high-speed small business accounting. Included in one seamlessly integrated module are four full featured applications: General Ledger, Accounts Receivable w/Billing, Accounts Payable & Payroll. **\$295.**

COMMUNICATION SOFTWARE

Compuserve		Insigna SoftPC	249.
Compuserve Starter Kit	24.	Prometheus MacKNOWLEDGE	125.
Compuserve Navigator	45.	Software Ventures	
DeSoft		Microphone II v3.0	Special 219.
MacLink Plus/Translator	115.	Solutions, International	
MacLink Plus with Cable	139.	BackFax	125.
Freesoft		Synergy Software VersaTerm	64.
Red Ryder V10.3	54.	VersaTerm-Pro	185.
Hayes Smartcom II 3.1	88.	Traveling Software LAP-LINK	82.

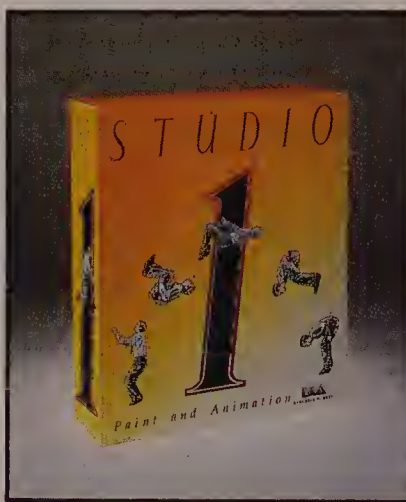


FASTAT by SYSTAT

FASTAT is a new statistics and graphics package for the Mac that is accurate and easy to use. Use it for graphics, tables, financial projections and surveys. **FASTAT** has more features and statistical routines than Mac stat packages costing over twice as much. Fast help, 3D scatterplots and surfaces, MacDraw-like tools, and color make **FASTAT** spectacular. ... **\$165.**

GRAPHICS SOFTWARE

3G Graphics		WetPaint: Various Vol. 1-18 (ea)	45.
Images w/Impact Graphics & Symbols	59.	Electronic Arts Studio 8 (MacII)	309.
Images w/Impact Business 1	65.	Studio 1	Special 99.
Adobe Systems Adobe Illustrator 88	299.	Enabling Technology Clip 3D (ea)	57.
Streamline	239.	Pro3D	285.
Adobe Collector's Ed. 2	139.	Foundation Publishing Comic People	23.
Newsletters	249.	Comic Strip Factory	39.
Forms & Schedules	299.	Generic Software Generic CADD	89.
Presentations	299.	Symbol Libraries:	Call
ITC Garamond (9)	125.	Graphsoft Mini Cad +	519.
Helvetica Condensed (14)	239.	Informix Wingz	269.
Stencil, Hobo, Brush (53)	95.	Innovative Data Design	
Life (83)	95.	Residential Construction	139.
Concord (84)	125.	Dreams	269.
Gothic 13/Tempo (85)	95.	MacDraft 1.2B	145.
Adobe Fonts (Various volumes)	Call	Letraset ImageStudio 1.5	275.
Aldus Freehand	349.	MacroMind MacroMind Director	449.



Studio/1 by Electronic Arts

With **Studio/1** you can generate incredible animation easily. Create an object, define a path, and **Studio/1** does the rest. Create spinning titles in seconds. Move and rotate objects in full 3D! It's as easy as pressing one button to record your strokes, another to play them back. Import your animation directly in to Hypercard. With **Studio/1** and Hypercard, you have everything you need to master artful presentations. **\$99.**

Altsys Corp. Fontographer 2.2	229.	MathSoft MathCAD	309.
FONTastic Plus 2.0 or KeyMaster	52.	Micro: Maps MacAtlas Hyper Atlas	64.
Ashton Tate Full Paint	67.	MacAtlas Professional	
Broderbund Print Shop	35.	(PICT/MacDraw Version)	129.
Drawing Tables	75.	Microsoft Microsoft PowerPoint 2.1	255.
Casady & Greene Vivid Impressions	69.	Micro Spot MacInteriors	199.
Quill Pack (vol. 8 & 20)	105.	MacPlot Series:	Call
Headline Pack (vol. 10-12)	145.	Miles Computing	
Modern Pack (vol. 7, 14-18) or		Mac the Ripper or Orchestra of Fonts	32.
Distinctive Pack (vol. 8, 19-22)	195.	People, Places-Things or Taking	
Classic Pack (vol. 3-6, & 13)	195.	Care of Business	32.
CE Software Calendar Maker	32.	NuEquation Nu Paint	95.
Claris MacPaint II	99.	Olduvai Software	
MacDraw II	309.	Art Clip or ArtFonts 1, 2 or 3	55.
Claris Cad	625.	Paracomp Swivel 3D	289.
Cricket Software Cricket Draw	167.	Silicon Beach Software SuperCard	135.
Cricket Paint	95.	SuperPaint 2.0	129.
Pictograph	85.	Digital Darkroom	195.
Cricket Graph	115.	Super 3D 2.0	325.
Cricket Color Paint	179.	Solutions International	
Cricket Presents	289.	The Curator (Catalog Your Art)	75.
Deneba Software Canvas 2.0		Springboard Certificate Maker	24.
(Includes Desk Accessory)	175.	Springboard Publisher	109.
Dream Maker		SuperMac Software Pixel Paint 2.0	199.
MacGallery (Hypercard or Paint)	27.	Symmetry	
Cliptures (vol. 1 or vol. 2)	89.	Picture Base & Wet Paint Bundle	85.
Dubl-Click Software World Class Fonts:		Synergy KaleidaGraph	119.
Various Vol. 1-8 (ea)	45.	T/Maker Christian Images	35.
World Class Lasertype:		Click Art EPS Illustrations	75.
Various Vol. 1-6 (ea)	45.	Zedcor DeskPaint 2.0	69.



MacEnvelope 4.0 by Synex

MacEnvelope with Postal bar coding for your ultimate envelope printing. Saves postage, speeds delivery. Create/save layouts. Keep address files. Import/Export. Bulk printing. Graphics, colors. Sort by Zip. Any fonts, styles and sizes. **\$55.**

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TOPS 2.1/InBox/FlashBox by TOPS

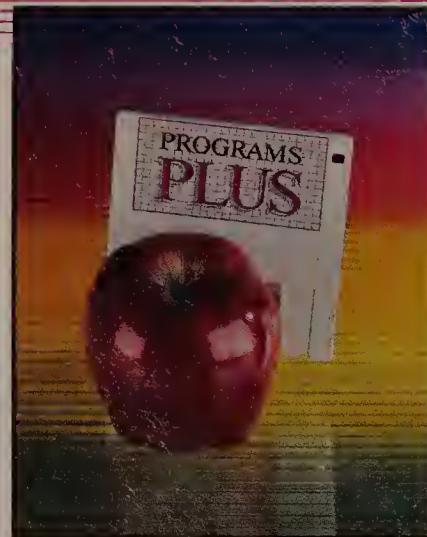
With **TOPS (\$149)** you can transform any Mac with at least 512K of memory into a TOPS Network station. **InBox (\$149)** enables users to send and receive messages, memos, and files over a TOPS Network. With **FlashBox (\$125)** you can speed up your AppleTalk network and allow your Mac to communicate at the Flash talk speed of 770K bits per second.

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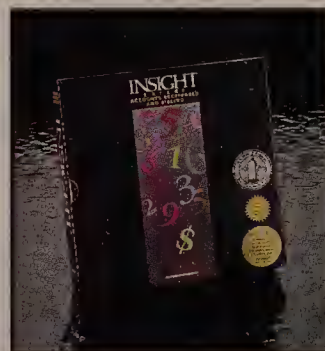
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HYPERMEDIA & LANGUAGES

Beacon Technology		Smethers & Barnes	
HyperBible King James	Special 159.	Prototyper	129.
HyperBible International	Special 195.	Symantec Lightspeed C	165.
Borland Turbo Pascal	68.	Lightspeed Pascal	95.
Bright Star Technology		Just Enough Pascal	49.
Hyper Animator	109.	TENpointO FocalPoint II	119.
Consulair		Trendware Corporation Stack Cleaner	29.
Mac 68000 Dev. System	57.	HyperTools 1 or 2	58.
Hyper Press Script Expert	49.	T.M.L.	
Manx Aztec C	65.	TML Pascal II V3.0	115.
Aztec C + SDB	99.	TML Source Code Library II	42.
Aztec C + MPW	99.	Zedcore	
Microsoft Quick Basic	69.	ZBasic 5.0	99.



Insight Expert Accounting Series by Layered Inc.

A series of stand-alone or fully integrated accounting modules for general ledger, accounts receivable w/billing, accounts payable, payroll, inventory control and time billing which gives you answers, advice and analysis. Now includes *Data Import!* **\$409.**

WORD PROCESSORS & DESKTOP PUBLISHING

Access Technology Mind Write 2.0	95.	Letra Studio	289.
Mind Write Express	135.	LetraFonts (Various Vol. 1-45 ea.)	65.
Aegis Showcase F/X	199.	Microsoft	
Allan Bonadio Associates		Microsoft Word 4.0	255.
Expressionist 2.0	79.	Paragon Concepts Nisus	Special 259.
Aldus Corporation		Preferred Publishers	
Aldus Persuasion	385.	Vantage	59.
PageMaker 3.0	389.	Quark, Inc.	
Ashton Tate		QuarkXPress V2.0	499.
FullWrite Professional	265.	QuarkStyle	189.
Broderbund DTP Advisor	47.	Symantec More II	255.
Caere Omnipage	559.	Symmetry Acta Advantage	65.
Claris MacWrite II	185.	T/Maker Company	
Design Science		WriteNow V2.0	109.
Math Type 2.0	99.	U.S. MicroLabs Font Sizer	79.
Emerald City Smart Art	95.	Word Perfect Corporation	
Letraset		Word Perfect	179.
Design Studio 1	459.	Working Software	
Ready, Set, Go! 4.5	275.	QuickLetter	75.



StickyBusiness/DiskFinder/myDiskLabeler by W&M

StickyBusiness (\$99) solves your business labeling problems! It's the best general purpose labeling program on the market. Comprehensive text, graphics and merge capabilities plus pre-formatted templates for all popular labels, cards and tags. **myDiskLabeler (\$34)** labels disks to keep you organized. **DiskFinder (\$27)** is the desk accessory that instantly locates files on mounted or unmounted disks.

BLANK MEDIA

Single Sided 3 1/2" Diskettes		Centech 3 1/2" DS/DD Color Disks (10)	19.
Bulk (Sony) 3 1/2" SS/DD Disks (10)	14.	Sony 3 1/2" DS/DD Disks (box of 10)	16.
Sony 3 1/2" SS/DD Disks (box of 10)	16.	Fuji 3 1/2" DS/DD Disks (box of 10)	17.
Double Sided 3 1/2" Diskettes		Maxell 3 1/2" DS/DD Disks (box of 10)	17.
BASF 3 1/2" DS/DD (box of 10)	17.	Verbatim 3 1/2" DS/DD Disks (box of 10)	17.
Bulk (Sony) 3 1/2" DS/DD (10)	17.	3M 3 1/2" DS/DD Disks (box of 10)	20.



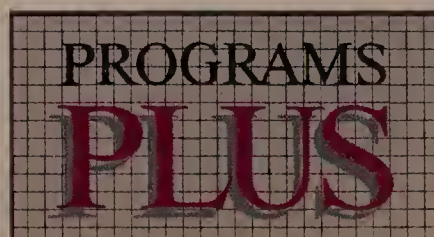
HyperBible by Beacon Technology

HyperBible makes Bible study easy and fun! Features include: 100,000+ marginal note entries which categorize verses into almost 5,000 topics, studies of each book, studies of all the major characters, archeology articles, an electronic Bible Atlas, pronunciation of proper names. HyperCard based system. King James Version (**\$159**), New International Version (**\$195**).



4th Dimension by Acius

4th Dimension is the standard in Macintosh databases. It is easy enough for beginners, yet powerful for high-end users. **4th Dimension** will be up to 100 times faster! The need for programming is almost eliminated! All registered owners of Version 1.0 will get a free upgrade to Version 2.0! Buy now because Version 2.0 will be going up in price. **\$385.**



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whole damn ocean. It seems more than daunting. It seems hopeless. Yet as I spoke to people in the movement, I was struck by rampant optimism.

Nobody underestimated the problem, but everybody seemed to think that we could get a handle on it. How? By massive expansion of the programs in operation. Organizations like Playing to Win and Computers and You see themselves as pioneers who will lend their experience to

other groups. The Well-Meaning Dream would have us imagine a computing center in every community that needs one.

"When there are 20,000 access centers, you won't see any problem," says Margaret Barclay, PTW's director of development. Timothy C. Jamerson II, who manages Computers and You, seconds the notion. "I'm totally optimistic," he says, "that this is a viable solution to the imbalance in computing access."

This space
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your Mac.

But this
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Until now. But now there's a way to take full advantage of the Macintosh operating system's 8 megabyte capacity—without shelling out megabucks for expensive memory chips.

Introducing VIRTUAL—the virtual memory software for the Macintosh II, IIfx, IICx and SE/30. By putting information normally stored in RAM on your hard disk—and retrieving it transparently as required—VIRTUAL allows you to run multiple "memory hogs" concurrently under Multifinder. And at just \$295 (or \$695 for the Macintosh II), VIRTUAL not only helps with memory that's too full... it also helps keep your checkbook from getting too empty.

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Circle 20 on reader service card.



A GLASS HALF FULL

There are real problems imagining how this particular dream could become reality. Take, for instance, the corporations now donating machines by the hundreds. How eager will they be to donate computers by the tens of thousands? But perhaps we should take a cue from the people who claim that good works will yield results. Let's call those unmentioned, but obvious problems—are you listening, Norman Vincent Peale?—challenges.


Most important, these challenges are not simply for other people: they are challenges for us, those who live for computers and make a living by them. Using computers to empower people will not succeed as a spectator sport: it will only work if we recognize its importance, and *do* something about it.

I'm going back to that computer center in East Harlem to donate some surplus equipment and share some of my skills. And here's why: the day of my visit to the center, I listened as one of the center's counselors introduced a young black man to telecommunicating. The two of them sat side by side in front of a Mac SE hooked up to CompuServe, from which they accessed the Online Airline Guide.

"See, you choose your destination," said the counselor. "London, Rome, Paris, wherever you want to go. Then you can choose what time you want to go. And then you can book your ticket and even choose your seat."

The young man, who I later learned had never touched a computer before, surveyed the screen. He scrolled madly through the flight listings. He seemed enraptured.

For that moment, the world was at his fingertips.

For more information, contact Playing to Win, 1449 Lexington Ave., New York, NY 10128, and Computers and You, Glide Memorial Church, 330 Ellis St., San Francisco, CA 94102. 

Steven Levy is a Macworld columnist and the author of *The Unicorn's Secret: Murder in the Age of Aquarius* (Prentice-Hall, 1988).

...I see now.
...makes sense. Well done.
Exactly. So when do we start?"

How people who get what they want,
get what they want.



It takes quite a booklet to show you all the terrific ways Apple Desktop MediaSM can help you express your ideas.

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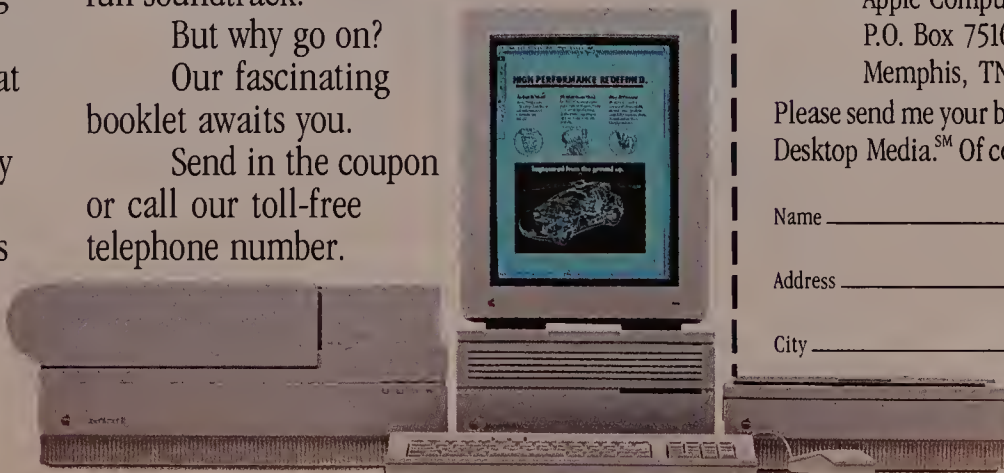
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Our new Mac II modem has great inner strength.



From the moment you slip Ven-Tel's new Mac2400E™ internal modem into your Mac® II, you'll see that it's quite a bright performer.

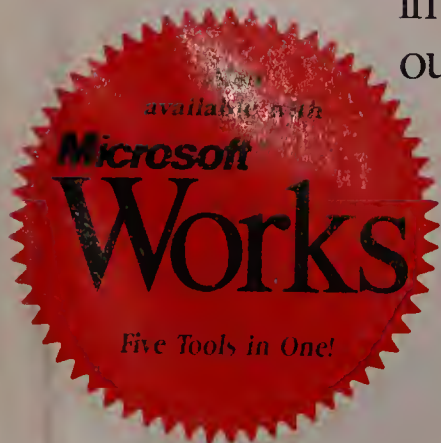
Using MNP™ Level 5 data compression to send and receive at a sharp 4800 bps, the Mac2400E greatly reduces telephone time. Which, of course, nicely reduces telephone bills.

Plus, the Mac2400E supports both X.PC and MNP Level 5 error correction protocols. So you can rest assured that the integrity of your data won't be dimmed.

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So don't just put any modem in your Mac II. Go with the one that outshines all the rest.

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#1 Mac Multi-Function
Business Tool

Circle 469 on reader service card

Recycled machines are big business. The total used-computer market for 1989 is expected to reach \$1.8 billion, according to the National Association of Computer Dealers. Most computers are sold privately, but there are other sources.

Sun Remarketing and Maya Computer specialize in used Macintoshes and peripherals. Sun was founded in Logan, Utah, in 1983. The company resells and services used Macs and discontinued Apple computers. Two-year-old Maya Computer, based in Waitsfield, Vermont, is similar but also lists sales through online information services.

Brokerages in Boston and New York offer yet another way to buy and sell used computers. The Boston Computer Exchange, established in 1982, acts as a broker between buyers and sellers nationwide. It is listed on CompuServe, or you can call directly. The seller is charged a flat 10 percent commission on each transaction. Buyers don't receive a warranty but have 48 hours to make sure the equipment works before the exchange pays the seller. New York's Computer Brokerage Services, which began business in 1987, is virtually identical in operation to the Boston Computer Exchange, but is smaller.

by the National Association of Computer Dealers. The \$12.95 *Blue Book* includes suggested prices for personal computers and peripherals. It also lists a directory for used dealers.

Conventional wisdom seems to be that used Pluses are a good buy. "It's usually cheaper to buy a used Plus than to buy a used older machine and then upgrade," says Dave Etchells, president of Perspect System, of Venice, California. Then again, sometimes buying a new Plus is not much more expensive than a used one. A used Plus can range from \$900 to \$1100; new ones sometimes retail for a street price of \$1300. ("Price Parade" lists used Mac prices at selected dealers.) If you're planning to add an accelerator or large display board later, an SE may be worth the extra cost. You may also be able to get a bargain on a used Mac II; sources say it's a buyer's market now.

Once you've found a machine, carefully check it out for signs of neglect or worse. Look at the outside of the case for dirt or an excess of dust in the ventilation slots. Nicks or marks at the back may indicate that a compact model has been opened without the benefit of Apple's official gadget. Has the owner opened the machine? Why? Has the memory been upgraded? SIMMs are preferable to other memory upgrades because of their construction and low power consumption, according to Marc Duisenberg, also known as Dr. SIMM at ComputerWare in Palo Alto, California.

Does the machine have a fan? Heat is the biggest enemy of Mac Pluses and earlier models. Ask how old the computer is, how long the owner has had it, and if the power supply has been replaced, advises Duisenberg. "On a Plus and a 512, the power supply is almost guaranteed to need replacement. It's almost like a time bomb." Steve Sawyer, managing partner of CJS Systems in Berkeley, California, says between 30 and 50 percent of older Macintoshes suffer power-supply failures. (continues)



Stalking the Used Mac

Advice and information
for the computer consumer

by Deborah Branscum



Dr. SIMM says check under the hood before buying a used Mac II. Broken memory-socket clips could put a damper on future upgrades.

I've heard favorable reports about online classifieds, but be careful. Make sure you can return your purchase if it doesn't work. A classified ad in the local newspaper got one satisfied *Macworld* editor her Mac Plus. For other leads check the *Sybex Computer Blue Book*, compiled

GOOD NEWS FOR SUITCASE USERS

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HOW TO JUGGLE THE MOST FONTS FOR THE LEAST MONEY

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And a new power supply doesn't come cheap. Having the board replaced by an Apple-authorized dealer can add up to \$250 to the cost of the machine. So try to find a machine that has an upgraded power supply and add a fan, if there's not one already, to protect your investment.

Look at the screen with the machine turned off to check for phosphor burns. If you can see a negative image of the menu bar, you've got burned phosphor, and the CRT may need to be replaced. Now fire up the computer. Take a look at the screen again. Some older SEs suffer from screen jitters as well as infamously loud fans. Apple will repair SEs with screen jitter at no charge, provided the serial number precedes F749xxxx. Does the video display suffer an intermittent ragged right-hand edge or momentary screen black-outs? The power supply may have a solder-joint problem. Etchells says you can check by gently but firmly rapping the left side of the case while the computer is on. Wavering, lines running down the screen, and a shifting display are also solder-joint symptoms.

Take the machine for a test drive with your favorite program. Let the computer warm up to full operating temperature, which takes 15 to 20 minutes. Plug in and test everything: mouse, keyboard, hard drive, floppy drives. Does the Macintosh format, copy disks and folders, and print? Can the hard disk be formatted? Problems (continues)



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Circle 202 on reader service card.



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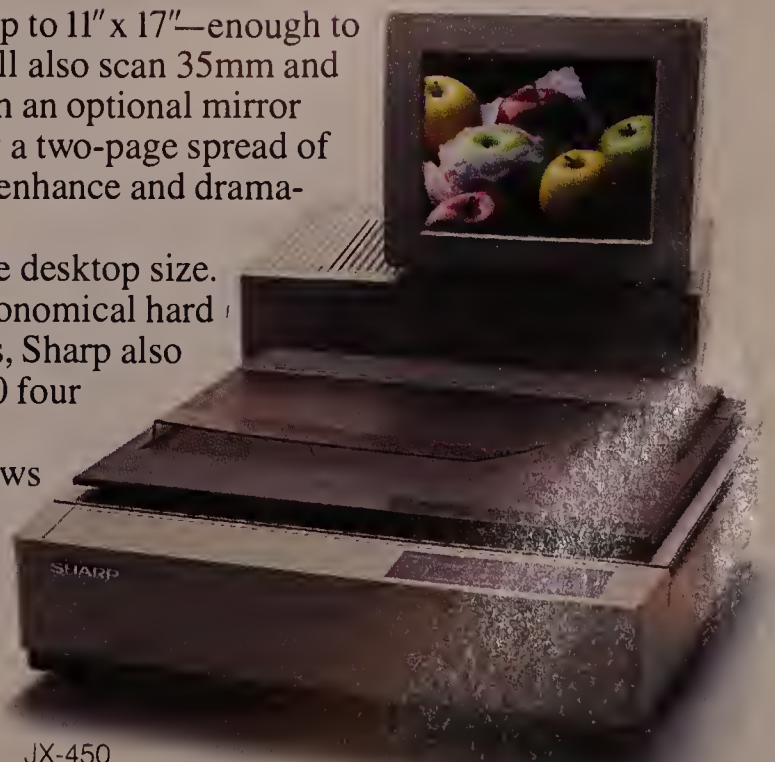
Scanning capacity is up to 11" x 17"—enough to scan a two page spread. It will also scan 35mm and overhead projection film with an optional mirror unit. Picture, if you will, how a two-page spread of finely colored images could enhance and dramatize your presentations.

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SuperMac standard graphics subsystems. A complete family of graphics cards and monitors for your business and your budget.

The first. And still champion.

When Apple® introduced the first color Macintosh®, SuperMac™ was first with a large display. The SuperMac 19" color monitor, combined with our 8-bit Spectrum color graphics card, extended the performance of the new Mac®. And enabled new users to work more effectively with the sophisticated new wave of color software.

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And take full advantage of desktop publishing and presentation programs. Databases and spreadsheets. On *any* Macintosh II or SE system.

The Spectrum/8 (Series II) card for the Macintosh II. Get 256 colors or shades of gray on the most popular monitors. Including ours.

The Spectrum/8 supports all of Apple's standard graphics modes—1, 2, 4, and 8 bit. With up to 256 colors or shades of gray on a 1024 x 768 pixel display, the full area of SuperMac's 19" monitor. For sharp, brilliant images that look just the way they'll print.

And its unique Virtual Desktop™ gives you the same area on smaller monitors, like Apple's 13" color or 12" monochrome displays. Just move your mouse, and hardware pan allows you to instantly view any part of an

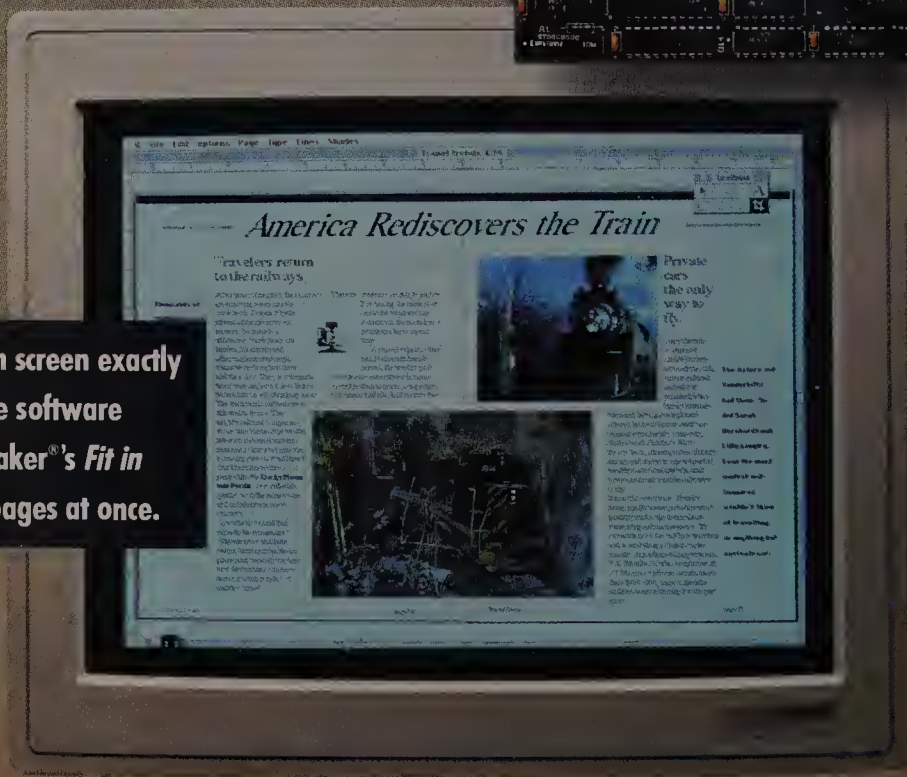
image that can't be displayed on screen at once. And hardware zoom gives you 2x magnification with a single keystroke.

And when 256 colors aren't essential, the Virtual Desktop lets you work in 2-, 4-, and 16-color modes. So you can reduce the number of colors on screen to enlarge your display up to 4096 x 1536 pixels.

The Spectrum/8 works with SuperMac's 16" and



See your document on screen exactly as it will print. Or, use software features—like PageMaker®'s *Fit in window*, to see two pages at once.



19" high-performance color monitors, based on Trinitron® technology. With our standard 19" color and grayscale displays. Plus Apple's 13" color and 12" monochrome monitors.

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SuperView for the Macintosh II family and Macintosh SE. To make the biggest projects as simple as black and white.

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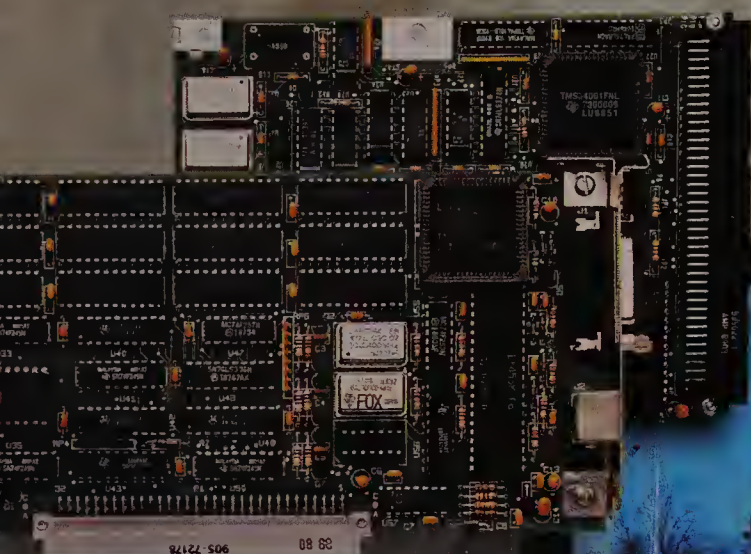
Spectrum/8. The only card that does it all. On most any color or grayscale monitor. The choice is yours.

Now there's a Spectrum/8 (Series II) designed just for the Mac SE/30.

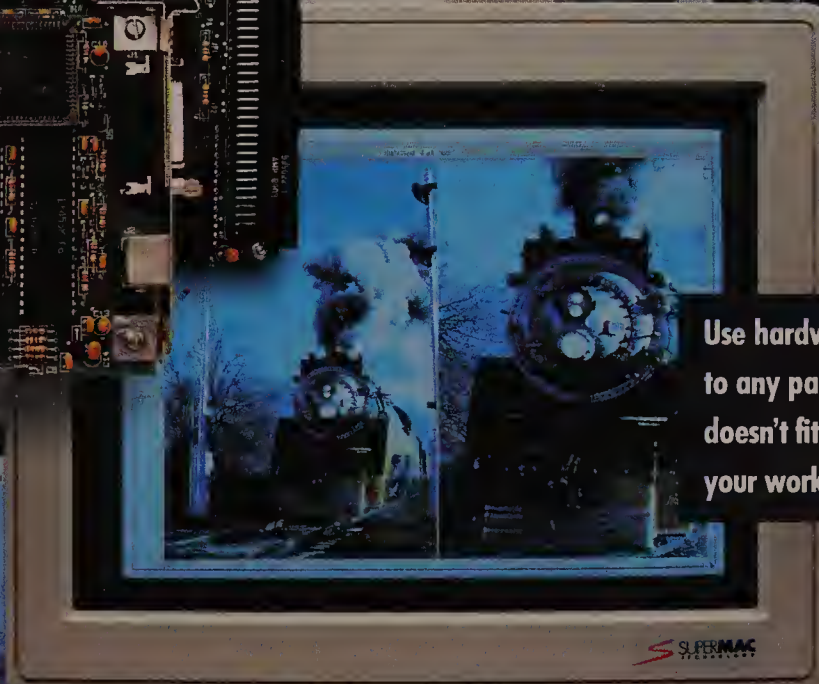
We're first again. Supporting Apple's first compact color machine, with the Spectrum/8 for the Macintosh SE/30. Delivering the same high-performance capabilities we pioneered for the Macintosh II. Including the ability to support multifrequency monitors, and industry-standard NTSC monitors and projection equipment.

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See your authorized SuperMac dealer today. And choose the SuperMac standard graphics subsystem that's right for your Mac, your business and your budget.



Use hardware pan to move instantly to any part of an image. Even if it doesn't fit on screen. And zoom to see your work at up to 2x magnification.



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Boston Computer Exchange Boston, MA; 617/542-4414	48-hour escrow	\$900	\$2175	\$2295	50% of sales price	50% of sales price	50% of sales price
Computer Brokerage Services New York, NY; 212/947-7848	48-hour escrow	\$1050	\$2300	\$2600	n/a	n/o	n/o
Interstate Computer Bank Mountain View, CA; 415/968-8733	90 days	\$1095	\$2300	varies	50% of sales price	50% of sales price	50% of sales price
MacHeaven Chantilly, VA; 703/263-2567	30 days	\$1075	\$2195	varies	\$825	\$1600	not buying
Mayo Computer Waitsfield, VT; 800/541-2318	6 months	\$1195	\$2375	\$2740-2800	\$700-900	\$1500-1800	\$1900-2100
North Shore Computers Milwaukee, WI; 414/963-9700	90 days	\$999	\$2500	n/a	\$550	\$1700	n/a
Shreve Systems Shreveport, LA; 318/635-1121	30 days	\$1090	\$2350	\$2625	\$700-800	\$1600-1700	\$1900-2000
Sun Remarketing Lagan, UT; 801/752-7631, ext. 395	90 days	\$1095	\$2495	\$2695	\$850	\$1500	\$2000

*Includes CPU, floppy drive, keyboard, and mouse.

Used computer prices change almost daily, depending on supply and demand. The SEs listed include a 20MB hard drive, keyboard, and mouse; floppy-drive models are less expensive. The Mac IIs listed include 1MB of RAM, a floppy drive, keyboard, and mouse but no monitor. The suggested retail price of Pluses, SEs with 20MB drive, and Mac IIs (with extended keyboard) are \$1799, \$3769, and \$5098, respectively. Many dealers offer new machines for much less. At press time, MacHeaven was selling a Mac II configuration with a floppy drive, 40MB hard drive, keyboard, and mouse for \$3195. Sun Remarketing listed a similar configuration, plus a monochrome monitor, for \$4995. Computer Brokerage Services is a clearinghouse for individuals who set their own prices, with some interesting results. A Mac II CPU with a 40MB hard drive was listed for \$2640, for example, only \$40 more than the low-end model included in the chart.

with 800K internal floppy drives seem fairly common, though less so than problems with power supplies. The older 400K floppy drives are beginning to gum up after all these years, according to Etchells, so note if the machine is sluggish in ejecting disks, particularly in cold temperatures. If that's the case, floppy drive replacement may loom in the near future. Be sure to test the SCSI port—check ahead of time to see if the owner has an external drive you can use, or borrow one.

BMUG offers a disk with four applications for testing a Mac, including an explanation of how the tests work and what

they mean. Ram Test tests the RAM for defects. SCSI Evaluator tests a hard disk drive for bad sectors. Test Pattern Generator (\$10 shareware) checks to see if the screen matches the standard sizes and will also test the sound chip. Speedometer (\$25 shareware) compares the speed of the Mac it's testing with other kinds of Macs. Send a request for the Test Disk with check or money order for \$4 to BMUG, 1442A Walnut, #62, Berkeley, CA 94709. (Your local user group may have such a disk as well.) And don't forget to pay the shareware fees!

(continues)

Kensington Turbo Mouse. For those who'd rather be quick and to the point.



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It takes half the space.

You move only the ball, not the whole mouse, so there's no rolling room required.

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It's twice as smart. Its 200 CPI resolution is twice that of a mouse. It lets you use one button as a click, the other as a click lock. And with a Mac SE or Mac II, it will even perform one command when you press both buttons at once.

It's perfect for any Mac. For Mac or Mac Plus, choose Turbo Mouse Plus. For Mac SE or Mac II, Turbo Mouse ADB. Both are \$169.95.

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If you depend on Apple, 3Com, Novell, or TOPS for your networks, then count on the PhoneNET System to keep them working.



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No matter whose network services you buy, if they're not wired right, they'll never work right.

The PhoneNET System is a network wiring system that makes networks work in the first place. A combination of hardware components and network management software that runs your network over ordinary twisted-pair telephone wire.

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And PhoneNET is the only fully-integrated line of products to build and manage everything from small networks to large internets.

In fact, with more than 750,000 units installed, the PhoneNET System is the industry standard for wiring networks together over telephone wire.

PhoneNET family planning.

The PhoneNET System is modular. You can start with a small, one-room network and easily expand to multiple floors or several buildings.

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The PhoneNET Connector connects each device to the network, whether it's a small network or a branch of a larger one.

The PhoneNET StarController is a central "hub" that repeats network signals and sends them over multiple branches. It comes with StarCommand software to view network load and test wiring.

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LocalTalk or Ethernet? You can have both.

You no longer have to sacrifice economy for speed.

Sure, the PhoneNET System provides an affordable way to run LocalTalk. But sooner or later, you may want to add more speed

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No problem.

Farallon's new products support industry-standard 10 Mb Ethernet over telephone wire, so you can increase the speed of those sections of the network which require more performance.

And if you're wondering how we'll fit into your long-range plans, you'll be glad to know the PhoneNET System was designed right from the start to work with ISDN.

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Circle 31 on reader service card.

SERVICE HERO

An obscure bug in the Radius Two Page Display software caused William R. Gaskill's Mac to freeze on start-up. But finding this bug was no easy matter. First Radius sent Gaskill new software. Then the local dealer replaced the Accelerator 16 board he was using and the display video board. When there was still no improvement, Radius asked Gaskill to ship his Mac to the company. Three days later he was phoned with the bug

report. Radius said it would fix the problem in the next software release; in the meantime, the easy workaround is to turn on any additional feature in the display control panel. "Radius support came through with flying colors," writes Gaskill. "I received my Mac the next day, with a personalized note from Radius support thanking me for my persistence and understanding in helping them identify the problem."

Tech types who plan on buying Mac IIs should ask to pop the chassis and remove the hard disk mounting plate to access the SIMM sockets. Carefully check the small plastic clips that secure the SIMMs on each socket. "The clips are easy to break," says Duisenberg, "and if they are broken the SIMMs will not be able to snap in place." Loose SIMMs may show up as bad memory. It's a problem you may not discover until you add more memory to the machine. Worse yet, it's a tricky repair job. Mike McCord, owner of Micro-Doc in Eugene, Oregon, confirms that changing the clips is a lot of work—too much work for most Apple dealers, who are likely to sell you a new system board instead. Still, Mac IIs are good machines. "We seldom see them for repairs," says McCord.

Used-computer dealers generally offer warranties, but also try asking for one from a private seller. If you can't get one, make the purchase contingent on a clean bill of health from an experienced service center (CJS Systems, for example, charges \$30 for a half hour of diagnostics). If the seller won't pick up the cost, pay for it yourself. Why bring home a lemon?

USER GROUP QUEST

Apple has a special program to help approved user groups purchase computer equipment at a worthwhile discount from a short list of Apple products. It's a one-time-only thing.

Getting a system is almost as difficult as finding the Holy Grail. In order to

qualify, a user group must be in good standing with Apple for one year or longer, operate on a not-for-profit basis, provide a certain level of member services, and meet other stringent requirements. According to Ellen Leanse, manager of Apple's User Group Connection, the group must also outline a specific plan regarding the use and benefits (such as a bulletin board system) of the machine and provide contacts to allow Apple to check on the system's use. And a local authorized Apple dealer or other Apple representative must cosign the application package, vouching for the legitimacy of the group and the intended service. (Get the message? No knaves need apply.)

The pure of heart who think they qualify should write to the User Group Connection, Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014.

IT'S HOEDOWN TIME

The Pemi-Baker Computer Users Group in Plymouth, New Hampshire, will hold its annual barbecue on August 19, beginning at 10 a.m. A used-computer market and demos will enliven the proceedings. Call Henry Ahern or Cindy Downing at 603/536-3880 for the lowdown. **M**

I love happy endings. Send your nominees for sainthood to Service Heroes, Macworld, 501 Second St., San Francisco, CA 94107, or via AppleLink (Macworld) or Connect (Branscum). Conversely, drop me a line if a company is ignoring you. I will help solve your problem, if I can.

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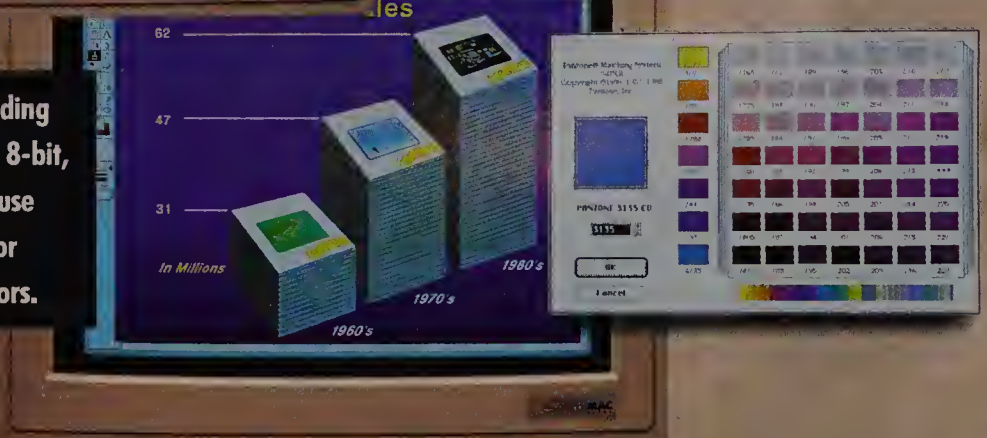
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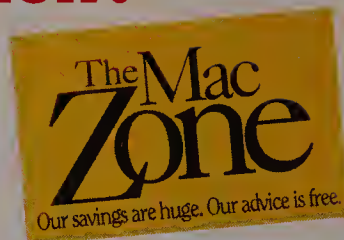


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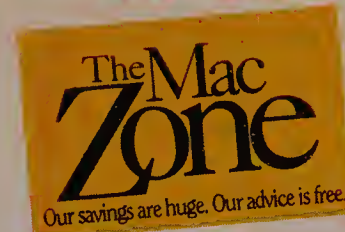
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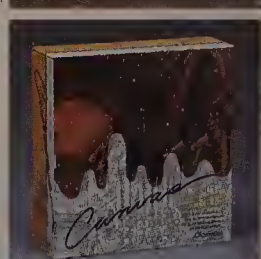
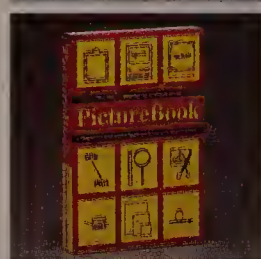
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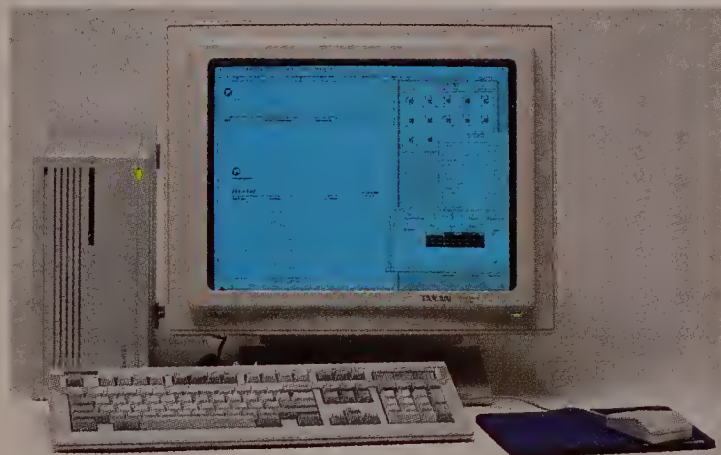
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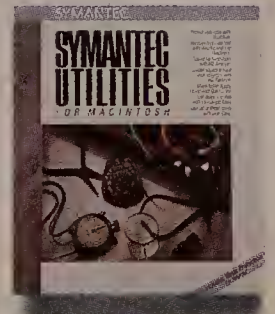
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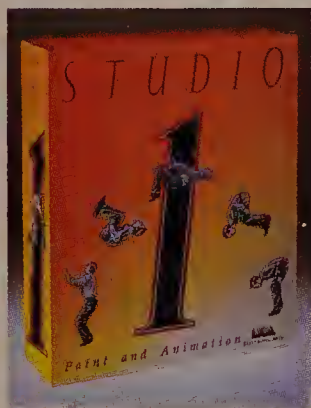
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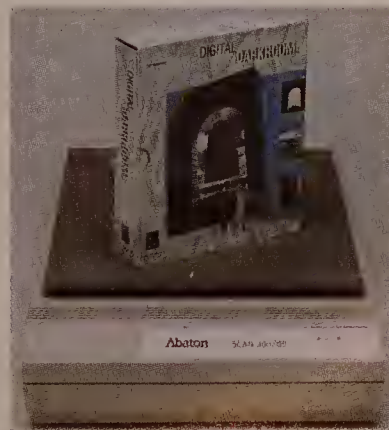
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The Show Must Go On

But these presentation
programs might make
you wish it didn't

by Thom Hogan



For some time I've been hearing about how great it is to prepare presentations on the Macintosh. The desktop presentation market that Apple and others crow about is not yet ready for prime time. To be quite blunt, my experience with the current crop of products shows them to be a long way yet from state-of-the-art, as well as missing many of the things that I need.

Even the best programs (Microsoft's PowerPoint and Cricket Presents 2.0) keep forcing compromises on me. My definition of a good tool is one that doesn't force me to compromise. I used PowerPoint, Persuasion, Cricket Presents, Stand-Out, More II, and MacDraw II 1.1 to create the same presentation (the same text, same coloring, same graphics, same notes, and same slide order). My conclusion: not one of this current crop is a precision tool.

OUTLINES ARE TOO RIGID

Although I don't use outlines for my writing, I do use outlines to structure my presentations. Thus, the built-in outlining facilities of More II and Aldus Persuasion should thrill me no end. Well, they don't, for a reason that isn't obvious until you have really tried to use them.

A good presentation uses cues and reminders to help the audience follow along. What happens if, on a subtopic slide, I want to have both the topic and subtopic as headings? Suddenly, the presentation program begins to get in the way—the six I looked at want to collapse text slides into two levels from the outline. I often mix graphics-only slides in with my outline topics; after a graphic I repeat the previous text slide to pick up where I left off. Short of retyping text or using the Clipboard to make a copy of a slide and positioning it manually, there's no way of repeating a slide directly from the outline. Changing an outline to add a new

level sometimes forces you to go back and change slide styles. And, except in Persuasion, when you are working with the slide images changing slide order or changing text directly on a slide doesn't change the outline. Whew!

What I also need is the ability to control where certain levels of an outline appear on a slide. For example, I might want topic A to appear at the top of a slide for subtopic a, and subtopic 1 to be the title of the slide. The current features of these presentation programs seem mostly hardwired when it comes to placing outline levels into a slide. I've been able to get the desired result with some presentation products, but not without a lot of extra work and repetition. Indeed, after seeing a presentation from a company with a presentation program, I asked the presenter how he had managed to do what I was trying to get his product to do. "We cheated," he said. "We figured out what all the slides should say first, then we went back and created the outline that would get them to say it." So much for using outlines to design the presentation.

MASTER THE POSSIBILITIES

Next on my gripe list is the way several products handle the creation of a master slide. The master slide is basically a template that you place on every slide. Some programs also let you set the background color and text styles.

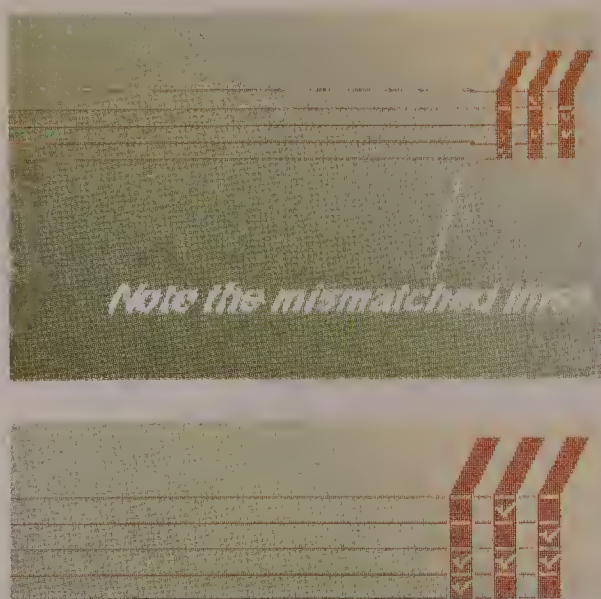
PowerPoint, for example, lets you build a template and create text styles that will be used in the template. Fine. Say I'm halfway through creating my presentation and I decide that the text size I specified in the template is too big. I can change the style for all new slides, but the ones that I've completed will have to be changed by hand. Not so fine.

For one presentation I wanted a graduated background with the darkest area in the lower-left corner and the brightest in the upper right, but with More II, Cricket Presents 1.0, and StandOut I had to settle for a solid color. (Note that even if a program supports graduated colors, the output device you use may not.)

PowerPoint normally has you work in a 66 percent reduced mode, which lets *(continues)*

you see the entire slide on the Mac II's 13-inch color monitor. You can work at full size, but full-size slides spill off the regular screen by just enough to frustrate your efforts to align objects to the edges. But in the reduced view, PowerPoint does funny things with lines and text: you can't tell whether two lines match up exactly. It was no end of trouble to create 1-point lines that run across a slide and connect to the 1-point lines in a graphic (see "Fine Lines"). I'd create a line in reduced mode, pop to full size to get the alignment right, then go back to reduced mode to get an idea of how it looked. After an hour of playing this game I longed for an E-Machines T16 Monitor so I could work in full size all the time.

Using Cricket Presents to create a master slide was relatively simple, although I wish it allowed me to set margins that I could align objects to. More II was simply frustrating. This outlining program has all kinds of presentation features hooked into it, but the hooks are often in the strangest places. Of the six programs I looked at, More II was the most time-



Fine Lines

The 66-percent view (top) of this PowerPoint image shows mismatched lines; the full-size view, which doesn't fit on a Mac II display, shows the lines aligned correctly. Which do you believe? (The full-size view is correct.)

consuming to work with. On the other hand, as an outliner, it is definitely the best I've seen to date.

Then there's Persuasion. The pre-designed templates Aldus supplies are nicely

done, but they're all labeled with letters (for example, Template A), so you'll need to turn to the manual to find examples of the one you want. And creating a new template taxed my patience. For the life of me, I couldn't figure out how to get this program to do what I wanted it to do. The manual is well written, but I read it three times and still didn't get the flash of insight that would enable me to accomplish my goal.

COLOR ME FRUSTRATED

When I needed to print out copies of my presentation on a laser printer, I discovered a surprise—virtually all of the color combinations I had selected, in virtually all of the programs, produced Rorschach-like blotches when printed. I hadn't given any thought to the fact that the printer was mapping colors to gray scales, so it shouldn't have been surprising that I got unsatisfactory results. I was shortsighted, but so is everyone once in a while. So the question is, what facilities do the programs offer for rectifying the problem?

PowerPoint, fortunately, has a fast and

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simple method of respecifying colors. This meant that I could go back and respecify all the colors and then reprint the whole thing. (PowerPoint has a gray-scale option in the Print dialog box, but colors that don't translate well to black and white still print out looking muddy.) With the other five programs I often found myself redoing colors by hand, sometimes slide by slide. The companies I've talked to have suggested I create a black-and-white palette for laser printer-generated presentations, but that means taking the time to do the presentation twice. Other alternatives they've suggested are buying a color printer or a film recorder. Well, neither of these choices is practical as a proofing device. Most color printers I've used have trouble matching screen colors; and film recorders aren't so hot either (see "From Slide to Screen," *Macworld*, July 1989).

All in all, it's frustrating even to attempt a presentation with an eye to keeping the quality at a professional level. The software never quite does what you need it to do, and the output can be extraordinarily bad.

SUCCEED DESPITE THE SOFTWARE

But what do you do if you must make the best of this still-emerging technology? Here are some recommendations that may make your task a little easier.

- *Keep your presentation files small.* If you've got a 100-slide presentation to create, break it up into five or so shorter presentations. It'll be easier to organize, easier to batch to a film recorder, and you won't find yourself having to scroll through screens of images to find (and move) the one you're looking for.

- *Keep your master slides simple.* If you are tempted to create a custom template, think again. Both PowerPoint and Persuasion include some very professional templates; use one of those as your starting point and make as few changes as possible.

- *Keep your color scheme simple and select colors that will translate to black and white.* Bright yellow and dark violet, for example, have quite different gray mappings. If you use a dark background (as most presenters do), use white and light colors for the text and for objects such as

charts and graphs. Better yet, use PowerPoint, which allows you to change the entire color scheme in a single command.

- *Use only one typeface—Helvetica.* And forget about anything less than 18 points in size (the folks in the back of the audience can't read smaller type). The injunction against other fonts is because only Helvetica seems to image correctly on all the film recorders out there. The serif faces (like Times) don't always look right, while Helvetica looks fairly presentable even if the recorder doesn't have high-quality fonts. Use italics and boldface judiciously for variation.

- *Prepare and place all graphics first.* Every time I complete text for a presentation and then go back and add graphics, I run into the same problem: the text takes up too much room and the graphic seems too small. If your graphic is there for a reason, it should make its point all by itself. So place it first and in a manner that allows it enough space. Then, if there's room, add text. In fact, I've stopped mixing text and graphics on one slide. (continues)

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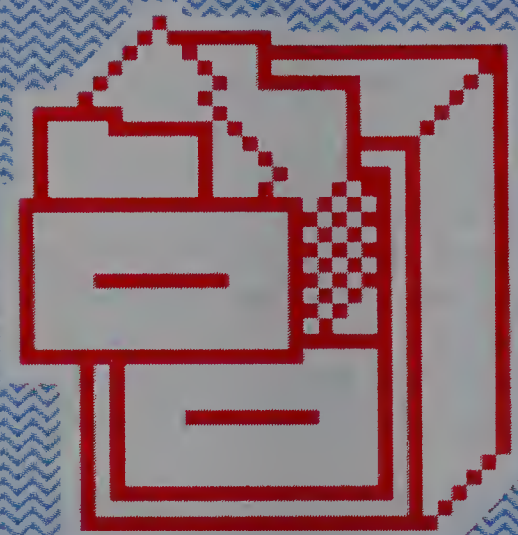
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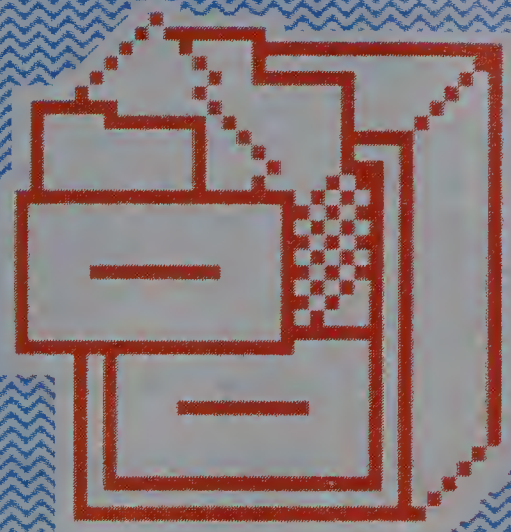
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If I have four lines of text on a slide and one of them needs a graphic to develop my point, I'll put the graphic on the next slide, then repeat the text slide after it so that I can pick up where I left off.

▪ *Keep it simple.* Most people don't understand at first how simple a slide presentation should be. Use text slides merely to keep the audience focused on what you're saying. One of the best professors I encountered in my many years of studying always handed out an outline of his lecture/presentation before each class. Because we knew the structure of his remarks, it made it much easier to capture the details—which, of course, could only be garnered by listening to what he was saying. The point is this: if the presentation doesn't really require your presence, you've developed a film strip, not a set of slides to accompany your remarks. Weak or unsure speakers tend to make the slides carry the presentation. That's wrong. You're the one with the expertise or knowledge, so you're the focus of the presentation. The slides are just there to underscore, demonstrate, and organize.

Of course, you shouldn't have to use an inadequate product. If you decide to hold off on buying any presentation product until they improve, you'll be sending a message to the companies to get their act together. There are signs that many people may already be sending that message. Several companies have expressed dissatisfaction with the number of copies they're selling. I think I can tell them why: they've invented the crayon. When they get around to inventing oil paints and a few more brush sizes, maybe the market will pick up and users will be more enthusiastic. Now then, whether any of the software companies working on these products is aware of the limitations they're imposing on users is another story altogether. **M**

See *Where To Buy* for contact information.

Thom Hogan is the president of Macreations, a Macintosh software developer, and publisher of The Macintosh II Report. His reference book, Programmer's Macintosh Sourcebook, was recently published by Microsoft Press.

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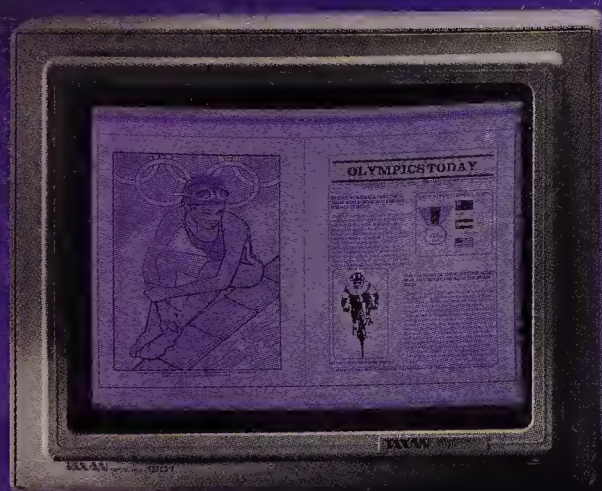
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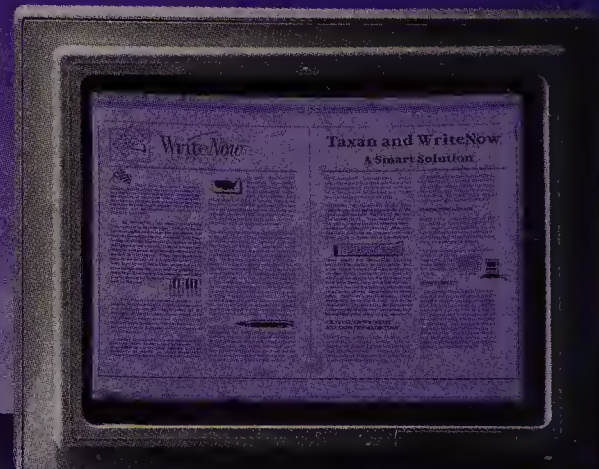
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chief scientist at
SuperMac

Steve Edelman grew up in Orlando, Florida, the "mildew capital of the world." He graduated from Cornell University with a degree in electrical engineering. After graduating he worked briefly at NCR, then left to make S-100 computers at Ithaca Audio, the first company he founded. His second company, SuperMac Technology, has annual revenues of over \$40 million. Now chief scientist at SuperMac, he is credited with having led the company out of a disastrous relationship with Scientific Microsystems (SMS) and back to the mainstream of Macintosh developers.

How did you become involved with personal computers?

In 1974 I was reading a newsletter, written by Hal Chamberlain, called the *Micro 8 Newsletter*. I became involved with Hal and built my own CPU. It had a hand-etched PC board, a hand-bent metal case, a hand-wired transformer, a block of aluminum I machined to make a paper-tape reader, and 1K of memory (later expanded to 4K). By the spring of my senior year in college it finally ran. I was hooked.

How did Ithaca Audio become Ithaca InterSystems?

In 1977 I started the company in earnest.

I rounded up venture capital funds, but by 1980 after a fight with the venture capitalists I decided to leave. It was an amicable parting. The company lasted until 1986.

Are many of the companies from that milieu left?

It's sad. Recently the last S-100 company, Cromemco, took down the sign in front of its building. It's the passing of an era. Imsai, Vector Graphics, Godbout, MITS—all gone now.

When did you start developing for the Macintosh?

In late 1984. The first thing we did was to decide that the original Mac was not the

machine that we would eventually develop for. So during the first year we decided to set up a company and gather people. In 1985 Apple dealers had a policy of swapping 128K boards for 512K boards. At Stanford then there were thousands of 128K boards available that didn't have to be sent back to Apple. So we bought them and upgraded them to 512K motherboards and sold them to retailers. Those boards were the float needed to start a business. I started SuperMac on \$100,000—\$50,000 from me and \$50,000 from my father.

The DataFrame hard drive is usually associated with SuperMac's rise as a major developer.

We began development late in 1985 and it was announced in January of 1986 with the Mac Plus. Our break came when Ed Colby at Apple said that he needed DataFrames and I gave him several. When John Sculley introduced the Plus with its SCSI interface, the DataFrame drives were used in the demos. It was a great plus for us. And after the 1986 rollout, everyone went to the Macworld Expo and saw our products. By the spring of 1986 we were doing more business in one day than in the whole previous year. And we still had no venture capital. This was at a time when the *Wall Street Journal* said Apple was near-bankrupt, the stock was \$15 to \$20, there were no cash reserves, and no one had a Mac. We grew from 4 to 40 people.

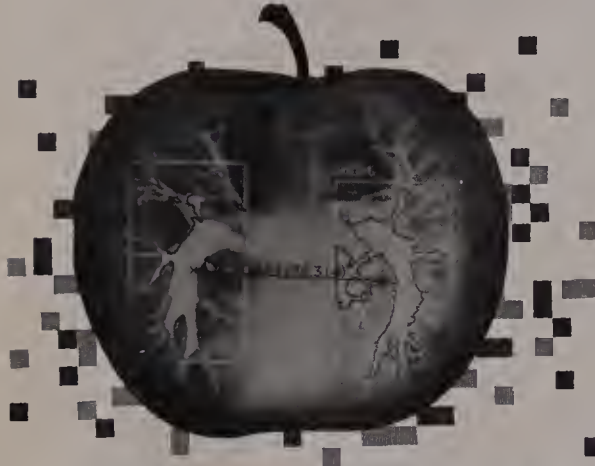
How did the company grow after the DataFrame?

The DataFrame was our major product through August of 1986. Our arch-competitor was GCC (in the 20-megabyte drive market). In the spring of 1986 we heard that the Macintosh II would ship. I decided to build a workstation monitor. I approached a Japanese vendor, who sent two representatives to us. I said that I wanted to buy 1000 units per month. These two chattered away for a while and then asked me if I would repeat what I had said. I told them and they chattered away some more. Then they said there must be some mistake, that they didn't ship that many monitors to IBM, (continues)



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Tektronix, and Hewlett-Packard combined. They inferred that I was a lunatic, and I couldn't tell them about the Mac II. Now we sell over 1000 monitors a month and the total market is well over that.

A deal with Barneyscan was announced. What happened to that?



The original plan was for SMS to license that product. The problem was that as SMS got in deep trouble there were no resources to put in the product. We had to tell the company to go elsewhere for venture capital funds. They have a great product, a slide scanner.

What went wrong at SMS?

I started the business in 1985 and by mid-1986 we were at \$10 million annually and a run rate of \$2 million per month with no debt. We just exploded. We could have sought venture capital, but in the start of 1986 there was no venture capital for the Mac market. That left two choices: keep growth flat or sell the company. We couldn't keep growth flat—how could we? The phones were ringing off the hook. Where we had one guy doing a job we needed a department. So we looked for a partner. It was not the wrong idea. We just chose the wrong partner. We thought that we saw in SMS a company with a large infrastructure, but without an exciting product line. We hoped to apply its know-how to our product line to continue to grow.

Why didn't the merger with SMS work?

For two reasons. First, sometimes after a divorce, people remarry and the stepchildren fight. When we merged with SMS, SuperMac became a stepchild. So we got no resources. Before the merger SMS

largely thought of itself as OMTI (its largest division), and unfortunately after the merger it still thought of itself as OMTI. This is a lesson to budding entrepreneurs—never underestimate the importance of corporate culture. K mart can't act like Nordstrom.

Second, soon after the merger the SMS product line came under unbelievable, brutal market pressure. Costs were not low enough to compete at the price the market demanded. Everyone was brutalized by Western Digital.

Western Digital is now in the Mac hard drive market?

Yes, it bought the Tandon drive line. Western Digital is a wizard at low costs, but you can't run a Maserati on retread tires. The lowest price doesn't always bring success.

SMS has filed for reorganization under Chapter 11. Will it survive?

I am not optimistic that we'll see it return to its old days, but I'm hopeful. I'm still the largest individual stockholder. At one point that stock was worth \$5 million. Today it's virtually worthless. The good news is that I'm still in the same apartment I've always had. It's good to lose 5 million bucks. It puts life in perspective. In the go-go environment of Silicon Valley, I have to say that I'm pretty lucky.

When did you decide to add software to the product line?

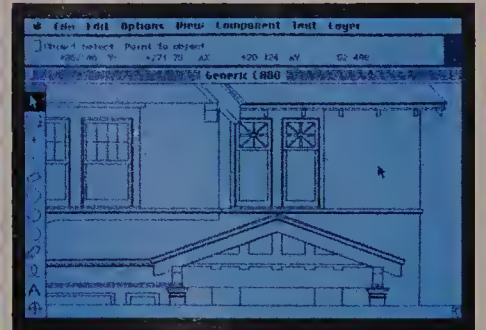
In the fall of 1986 we decided that the hard disk should ship with backup software because people wouldn't use the software if it didn't come with the disk. After a short while we went to the guys who did DiskFit. I was impressed with that product and wanted to make it available. We already had some developers working on a spooler [that would speed up printing], and in the end we shipped the spooler first. We took out two ads and the products began to ship like crazy. It's fair to say that we stumbled onto those products. By the spring of 1987 we split off the software group, made it a separate business. The products had no competition and they

(continues)

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took off in 1987. We had four products then: DiskFit, Sentinel, SuperSpool, and SuperLaserSpooler. In late 1987 we added PixelPaint. We had a hell of a team, only six people. Those were some of the best decisions we made.

There was trouble with SuperLaserSpooler.

Yes, when Apple revised the Finder to MultiFinder. It took months to make it compatible. Now it's trouble free and almost four times as fast as the AppleShare spooler from Apple. It spools QuickDraw commands, not PostScript; it's the only spooler that works with PageMaker. All of us agreed to do the work, but we didn't know how much it would take when we started.

You also had trouble with your hard drives.

Yes, in 1987, when we went from MFM [modified frequency modulation] to RLL [run length limited] techniques to increase capacity from 20MB to 30MB and from 40MB to 60MB for our drives. We tested our drives extensively, but just before we began to ship in volume, we found serious problems. August 1987 was the real low point—sales had just gone to a \$40-million-per-year level and we hit a wall. We shipped drives to the Boston Expo, but we knew we had problems at the factory, so we didn't let drives out at the show. We stopped shipping. The problem took three months to fix. In November of 1987 we began to ship again.

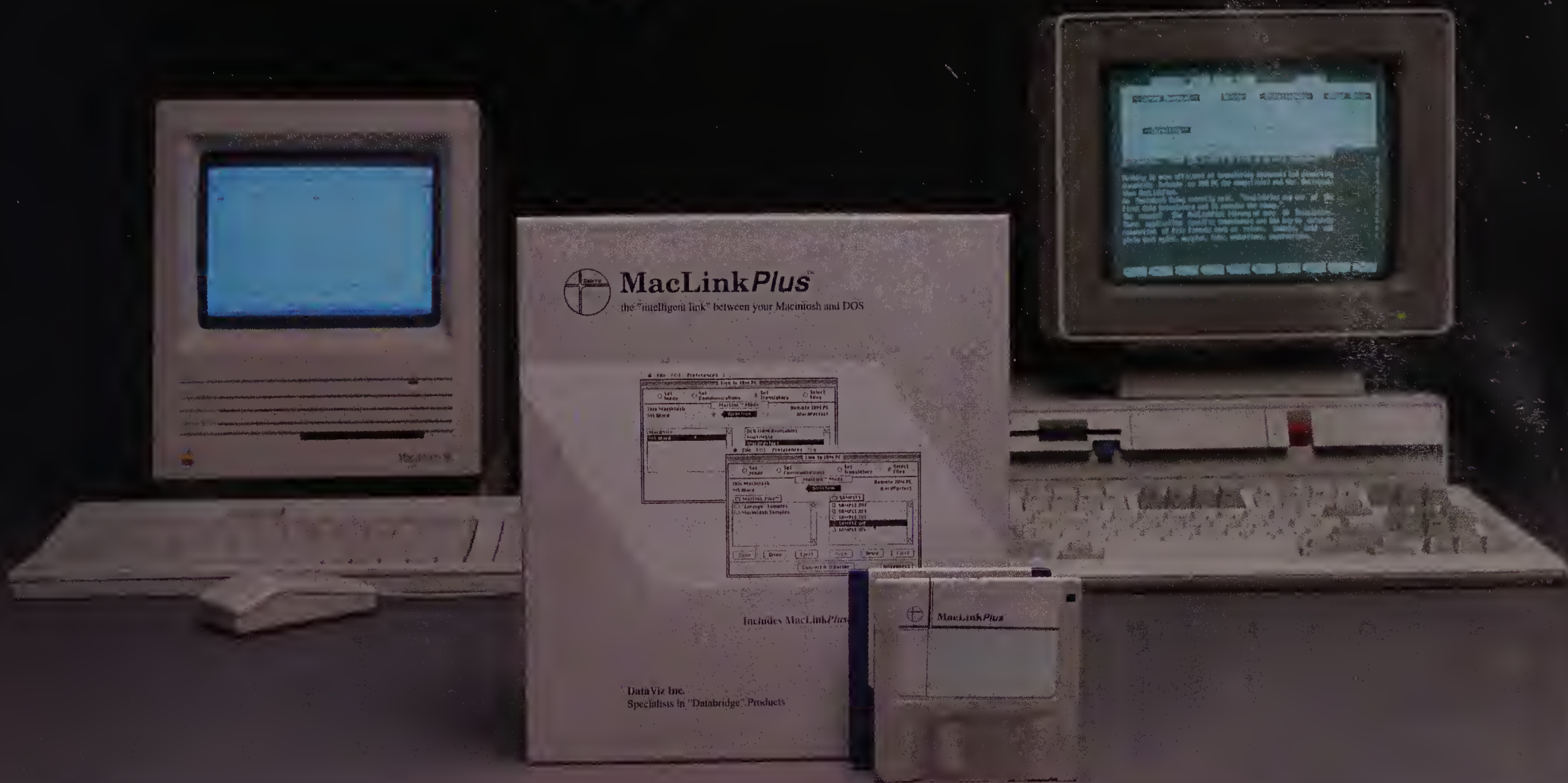
That's when the technical staff left?

That's a real sore spot with me. It was a personality thing. I don't remember when it happened exactly. It turned out to be a real gathering of the tribe. A lot of the technical support staff left, so the managers and I ran the support services. You could call technical support and talk to me during that period. Not all of the staff left. We hired another group of people and fixed the problems.

It's interesting. We got more bad press in the trade journals out of that. And yet when Andy Hertzfeld and Burrell Smith (continues)

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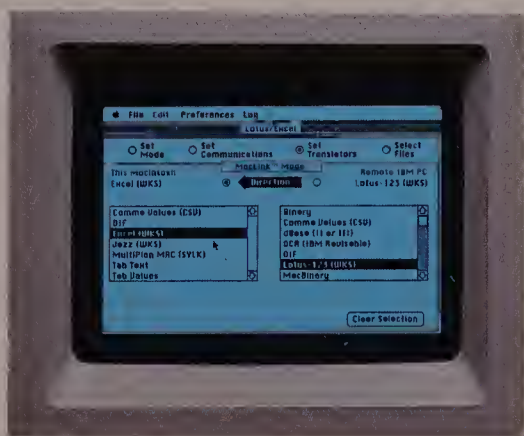
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AutoCAD on the Macintosh also supports the features that have made Apple the acknowledged leader in user interface design, offering pull-down, tear-off, and pop-up menus,

complete support for Multifinder™ and the Mac windowing system, along with file dialog boxes to make access to your drawing files quick and easy. Clipboard support allows the transfer of AutoCAD drawings to a wide variety of Macintosh applications software.

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MACazine
March 1989 / page 52

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Computers in Accounting
January 1989 / page 21

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left Radius there wasn't a peep. We learned a lot about public relations and how to run a business from that.

How did you get such a leap on the competition with color monitors for the Mac II?

In the fall of 1986 we began working on a video card design. By December of 1986 we had a NuBus card in fabrication. We had never seen the machine, only the specifications on timing. Suddenly we got a machine



and by pressing we got one wire-wrap up and running in the back room.

Apple called when they heard that and said they were amazed and could we do 100 more. Apple International bought one for each office; then each sales office in the U.S. wanted one; and then Apple called and asked us to bring a bunch to Los

Angeles for the rollout. I'll never forget the weekend before the rollout of the Mac II: I sat on the phone here in Mountain View [California], calling each sales office in the U.S. and the world checking on the monitor to ensure that when Apple made the rollout, each monitor would work. At the last moment, the Friday before the announcement, the video ROMs were changed. We had to switch to new boot ROMs and revise the boards in the field, in real time over the weekend. We made it.

Were you paid for all that support?

No. Why should we be? We were proud that Apple invited us to work with them and to participate in the rollout. There is one more part to the story. I called Ernie Beernink, one of the chief architects of color QuickDraw. I called him

at his office at Apple at 11 p.m. and asked him for some help. He told me he would stop by the company on his way home. He came in at 3 a.m. and helped us fix our bugs. He is the unsung hero of the Mac II.

How can SuperMac compete with Apple in peripherals?

I believe that any market can be divided into two areas. Core technologies and enabling technologies. Core is all of Apple's engineering resources. Enabling technology is something that has to be there to support core technology. Mac is core; hard drives and Ethernet are not. Core products are what you want to do. Enabling products are what you do to protect your core. For Apple, the Macintosh is the core. If a company can make its business in enabling technology, Apple is happy because then Apple can put more money into the Mac.

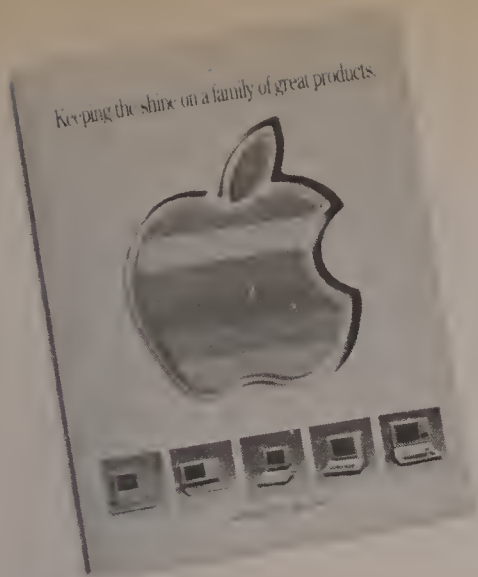
What are your favorite products in the Mac market?

The Shiva Netmodem. It's wonderful. The idea that ten slow modems can be replaced by one shared, fast modem is great. AppleLink, not because it's perfect, but because it does things in a straightforward fashion. It's made my life easier. Excel. I managed to run SuperMac to the \$2-million-a-month level on Excel, the whole business, and never lost a single piece of data. I can't say the same for our accounting package.

What are your reflections on Apple today?

Apple has figured out how to drive existing architectures forward while completing a changeover. Now IBM looks bad while it changes architecture. We're at the crossroads where Apple will be able to push forward, evolve the Mac to the next stage, or be forced to scrap it in the next few years. And 1989 is a pivotal year in which we'll learn if Apple has anticipated those areas that are important or if it's in a reactionary mode. Apple can't survive as a reactionary computer company. Sculley knows this.

(continues)



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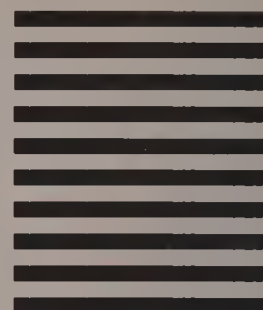
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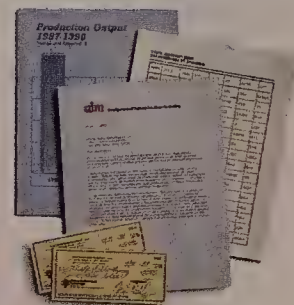
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What do you think of the 68030?

Apple will never build another 68020 machine. The 030 has memory management. IBM has shipped machines with memory management since the 286. And there are millions of those machines out there. Apple needs memory management to go to true multitasking. The exciting thing about the CPU chip of the new IBM machine, the 80386sx, is that it is so inexpensive. That's going to be important over the next two years. Motorola needs to make a cheap, plastic 68030 and migrate this down line.

What's after the 68030?

The 040. What happens is that the 030 takes six or seven clock cycles to execute an instruction. The 040 averages three, has higher clock rates, and a RAM cache. For example, our SE accelerator uses a 16MHz CPU with a 16K cache. It gives two times the performance of the 68000 at practically no cost. There are really three options—better processor architectures, faster CPUs, and parallelism, or more than one CPU.

What do you think of the Mac IIcx?

It's a wonderful idea. Three is exactly right. We have a saying here, "the search for the third board." The first card will be video. The second is for communications or for a DSP chip like Next's. The third slot is for what everyone wants. So what is the thing that everyone wants that goes in the third slot? That is the question.

Why has Apple had so much trouble shipping monitors on time?

I think everyone has trouble shipping monitors. Apple's being late is not indicative that it doesn't know monitors, but the opposite. It demands high quality, and if the supply is not up to its expectations, it won't accept them.

Why are there so many problems with the print monitor?

I haven't torn the Apple System software apart so I don't really know, but I can say (continues)

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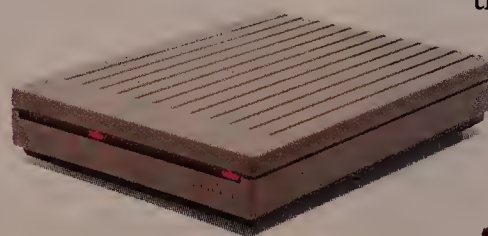
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VERBATIM

that the whole Mac way of printing raises issues. One result is that all applications developers haven't always followed the rules, often for good reason. For example, Aldus Prep. At the time of PageMaker's development, Apple's software didn't do what Aldus needed, so Aldus broke the rules. Other problems are created for



pooling with Apple's approach to printing. SuperMac's approach to spooling solves problems without letting the consumer know. It's pretty ugly on the inside but clean to the customer. Apple's approach is simple inside but is ugly to the consumer [you get intermittent messages from the print monitor]. Once we solved the problem, it wasn't an appropriate use of Apple resources to go through the pain and suffering of doing it themselves.

What's the next hot new peripheral category?

If you don't count video, which is my area, then communications. IBM products are information machines. Databases are much more successful in the IBM market. The Mac is less a container of information than a window on information elsewhere: it's a leader in communications. Most Macs are networked. But ISDN will blow open the Mac market. The Mac and ISDN were made for each other. The Mac plugs into a wall like a phone and can provide the communications that everyone wants.

Imagine that you are in charge of future CPU architectures at Apple. What are your plans and the challenges for the next ten years?

The most important realization is that people have a bottomless lust for power. Gassée says he wants someday to have enough power to simulate full-motion

animation on the Mac. The question is, how to get that kind of enormous computer power on the desk. One answer is in parallelism.

Apple is the only personal computer maker with a shot at making multiple CPUs work. The reason? Unlike on other CPUs, applications on the Mac run on the Toolbox, a set of program routines. So if I were the chief designer of CPUs at Apple, I would figure out how to make the Toolbox of three years from now and make it run the highest percentage of CPU cycles so that applications would be just a series of macro calls to the Toolbox. Then I would have to make sure that I could break down the Toolbox code and run it on multiple CPUs transparent to the applications developer.

What is the future direction of SuperMac?

Advanced graphics systems.

That's what Radius says. You'll compete with them?

I'm not surprised that they're saying the same thing. Radius has some good folks there; it'll be healthy competition.

We're seen as having a name for sophisticated graphics on the Mac. We're different from others in that we have decided to bring low cost to sophisticated graphics and make them mainstream, not \$4000 or \$5000 video cards. We hope to drop these capabilities to under \$1000 via VLSI. We designed our first chip [gate array] for a video card in 1986 and have done two more since.

In August of 1987 we showed a prototype of a 24-bit capability on a three-card set; six months later we had reduced it to a single card prototype for the Mac II. That's where we'll put our energy. There is a big promise of true color for 13-inch color monitors at low cost. You have to do it by allowing the user to roam the screen over a larger bitmap, but it's possible.

How do you accelerate QuickDraw for the Mac?

I think you've misstated the question. I would ask how to make the Mac more responsive. It's not clear that QuickDraw (continues)



Mac World



Mixed World

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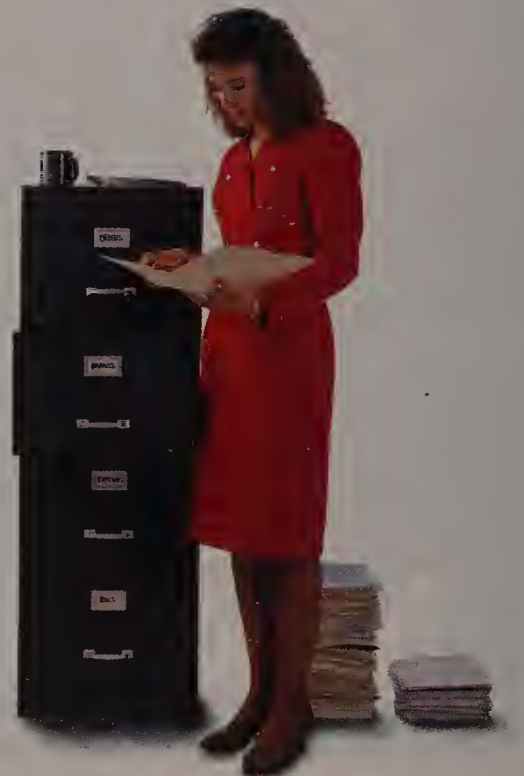
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TRAVEL AUTHORIZATION FORM

NAME: Smith, John EXTENSION: 7263 No. 6 7 - 1 3 - 2 9 4
DEPARTMENT NAME: Operations DEPARTMENT NO: 8817-A
PURPOSE FOR TRAVEL (CHECK REQUEST): Spring sales meeting.

PRE-TRAVEL PLANNED EXPENSES

AIR TRAVEL

TRAVEL AG: Blue Sky AGENCY PHONE NO: 5 5 5 - 3 3 7 8
Date: Mar 1989 Time: 7:45 AM Departure: March 21, 1989 Time: 6:15 PM Return: AIR FARE: 580.30
Airport: JFK Flight #: 1503 Airport: JFK Flight #: 730 TAX: 17.55
Airline: Northwest Airlines SUB-ACCOUNT: .88 TOTAL: 598.15

HOTEL

NAME OF HOTEL: Paradise COMPLETE PHONE NO: 7 1 1 4
2525 La San Diego, California 55789 TOTAL # N/G: 11
CHECK IN: March CHECK OUT DATE: March 21, 1989
CODE: A5507 DESCRIPTION: Rental TOTAL: 75.00
OTHER / MISC. EXP: 35.05

CHOICES

- Canadian Airlines
- Delta Airlines
- Northwest Airlines
- Pan Am
- United Airlines

COMMENTS

See Joan for airline receipts.

PRE-AUTHORIZATION

TOTAL TAX: 7.25
SUB-ACCOUNT: .57 TOTAL: 142.31
TOTAL PLANNED EXPENSES: 1,582.71
AMT PRE-PAID BY WC (Advance Amt.): 1,532.71

Travel Expense Forms

No.	Name	Purpose of Travel	DATE	HOTEL	AMOUNT	TOTAL
83-01-892	Robertson, Sharon	Meeting with G	03/10/89			
43-10-837	Russell, David	Trade show - N	03/10/89			
44-29-203	Scott, Karen	AGT Contract	03/11/89			
20-19-536	Sherman, Glenn	Developers' Co	03/12/89			17.30
34-20-200	Slender, Ray	Sales meeting	03/13/89			12.20
67-13-294	Smith, John	Spring sales m	03/21/89	853.75		33.10
72-65-192	Spencer, Ronald	Technology sem				
44-30-203	Taylor, Janice	Northern Telecom				
362 Forms						44.00

ACTUAL TRAVEL EXPENSE AUTHORIZATION

DATE: 03/21/89 TOTAL DUE: 6.24 5.70 28.10

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File Edit Arrange Style Settings Layout Windows

Point... Type Style... Corners... Field... Object... Format... Calculation... Check... Help Message...

ACTUAL TRAVEL EXPENSE AUTHORIZATION

DATE: 03/21/89 TOTAL DUE: 6.24 5.70 28.10

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Travel Expense Forms

83-01-892 Robertson, Sharon Meeting with G

43-10-837 Russell, David Trade show - N

44-29-203 Scott, Karen AGT Contract

20-19-536 Sherman, Glenn Developers' Co

34-20-200 Slender, Ray Sales meeting

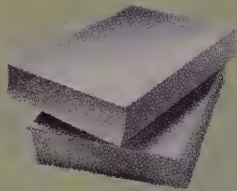
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is the gating item. Lots of the time the application kills you, not QuickDraw. Page-Maker is slow but that's because you're rescanning a database. Even if you spent zero time on QuickDraw it might not be faster, especially at 1 bit per pixel, where QuickDraw is quite good.

What about the future of optical drives?

Most people will not pay a large premium for removable mass storage. Today, optical disks are expensive. The seek time is slow, so people who go for them are those who need to carry around large amounts of data, a UNIX operating system, large databases, or images. For the next two years, the rest of the world will continue to favor 10MB to 20MB floppies, which are about ready to be announced. There is going to be a hell of a horse race for storage on the Mac.

Will SuperMac stay in storage technology?

Graphics and mass storage. The reason is simple: high-performance graphics require high-performance storage. We look for the bottlenecks and try to solve them.

Now that you have finally raised venture capital funds, do you have any recommendations for other developers?

I should have done it earlier. Venture capitalists are good people so long as you are on or ahead of plan. Their job is to make changes, some of which are painful.

Would you do all of this again?

My advice to budding entrepreneurs is to take a long time considering the opportunities in front of you. There are more of them available than you could exploit in a lifetime. Your job is to pick the best opportunity for success and then get the resources you need to handle the basic points of your business: finance, marketing, sales. Pick the best venture capitalists, those committed to your market and your business, not just check writers, and go at it. **M**

Interviewed by Jerry Borrell

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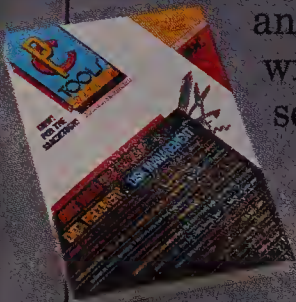


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MACWORLD NEWS

by Tom Moran

32-Bit Color for QuickDraw—At Last



In a move that promises to accelerate the use of realistic color in graphics applications, Apple has finally released its version of QuickDraw for 16-, 24-, and 32-bit color graphics boards. The Color Extensions release, which Apple will provide to customers as a free upgrade through dealers and online bulletin boards, provides a standard way for applications to create and display graphics using over 16 million colors.

Since the previous version of QuickDraw was limited to 256 colors, few software applications could take advantage of 24-bit color, because each 24-bit graphics board manufacturer had a different display scheme. With the release of Color QuickDraw, however, hardware developers such as Radius, Truevision, RasterOps, SuperMac, and Mass Micro can now ship their new 16-, 24-, and 32-bit graphics boards. Applications developers including Letraset, SuperMac, Adobe, and Aldus are already working on versions of their programs that support the new standard.

In addition to the 24 bits of color information, the new QuickDraw allocates 8 bits for

alpha, or transparency, information. Although Apple has not implemented routines that support transparency, the alpha information can be accessed by manufacturers who want to provide their own routines.

The new Color QuickDraw file format, tentatively being called Color PICT, offers significant economies in the size of color graphics files. Whereas 24-bit color documents could take up over 2MB of disk space, the new Color QuickDraw compresses image files using a technique called Run-Length Limited encoding.

Color QuickDraw does the best it can to maintain the color fidelity of an image, re-

gardless of the bit depth chosen, using a technique called dithering, which approximates missing colors by combining existing colors in various patterns. For example, an 8-bit color graphics board can approximate the colors of a 24-bit image by blending combinations from its original 256-color palette. Color QuickDraw also does a much better job of displaying color images on a gray-scale display system. Whereas two different colors could look the same using the older QuickDraw, Color QuickDraw guarantees each color will be displayed as a unique shade of gray.

The upgrade, which works with System 6.03 or later ver-

sions, consists of three files: new General and Monitors files, plus a 32-bit QuickDraw file. Improvements to the Monitors CDEV make it easier to configure and identify monitors when setting up systems with multiple monitors. When installed, Color QuickDraw occupies about 80K of space in RAM.

The Color Extensions upgrade will also include the LaserWriter 6.0 extension, which properly translates Color QuickDraw images into color PostScript for printing. Color images will print in color when sent to a color PostScript laser printer like the QMS ColorScript 100, or
(continues)



The 32-bit QuickDraw team relaxes at Apple. Back row: Dave Fung, Chris De-ross, Jean-Charles Mourey, Jim Strauss, Michael Heller. Middle: Bruce Leak, Jay Patel, Dave Wong, Dave Van Brink. Front: Laurie Girand.

ROBERT HOLMGREN

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they will be translated into gray-scale halftones when printed on black-and-white PostScript printers. LaserWriter 6.0 is incompatible with earlier versions, so all network users must upgrade at the same time.

—David Ushijima

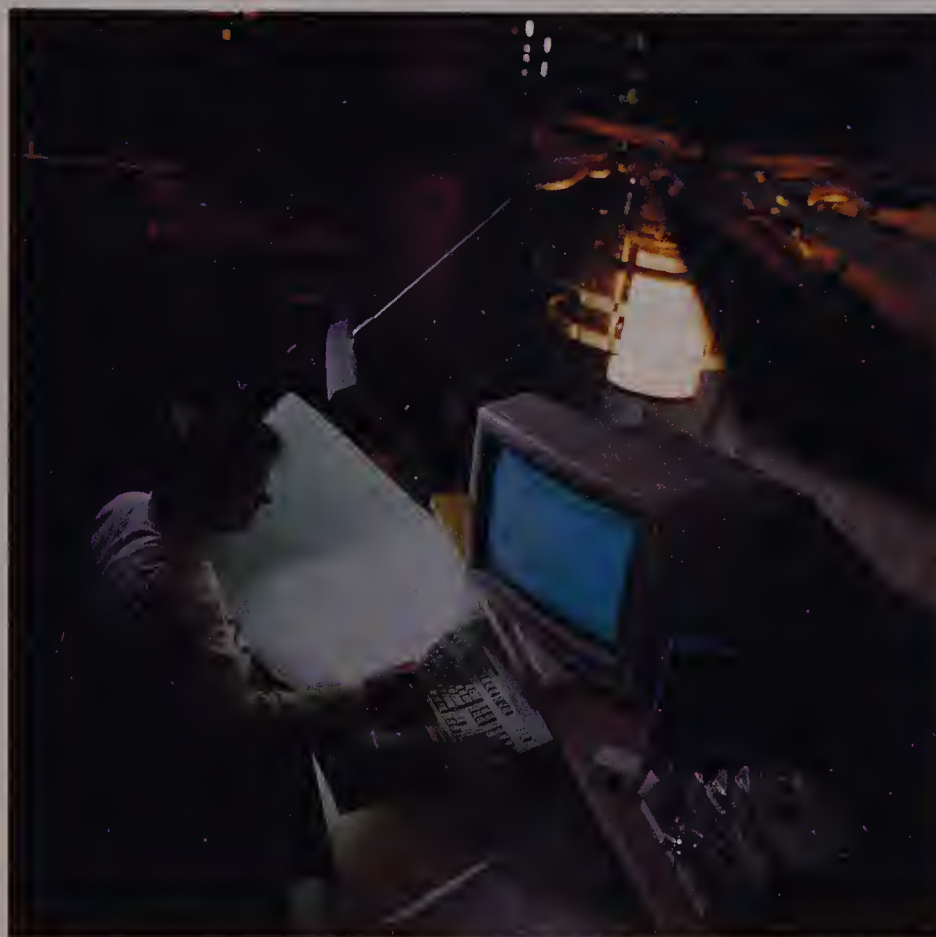
Engineering a Coup



The Mac isn't just for artists anymore. It's also meant for engineering types, whether they're building sports stadiums or writing memos. That was the message that Apple put across at the Apple Computer Engineering Forum in Seattle, using as springboards Apple's introduction of a large-screen monitor and the Mac IIcx in conjunction with the release of AutoCAD for the Mac. The forum boasted more than 40 vendors and dealers offering a multitude of new products—ranging from Architectonica's Building Code Analyst to Autodesk's AutoCAD—which cover the whole gamut of engineering tasks from word processing to signal processing.

Also on display was a simulated engineering office of networked Macs that showed applications for technical publishing (Interleaf Publisher, PageMaker), and connected to software for drafting (AutoCAD, Generic CADD), presentation (Microsoft Chart), analysis and modeling (MCAE from Inertia), budgeting (Excel), conceptual design (Claris CAD), and word processing (Microsoft Word).

The most interesting thing about the Engineering Forum is that it could have been successfully held at all. After all,



Stephen Kewish of Casablanca Fans in City of Industry, California, designing a fan assembly with VersaCad.

the situation for engineering software on the Mac is very similar to that experienced by general business software just a year and a half or two years ago. But, although the skeptics still remain, big-gun applications are arriving that may well engineer a coup for Apple.

—Steve Roth

A New Chartmaker and a New Word Processor



Access Technology has a new charting program for business and science applications that promises a lot of bells and whistles for only \$195. Tentatively named DeltaGraph, it divides the data matrix into pages to allow easy organization of lots of data points and lets you select data at random for plotting. It performs about

40 functions on data that you enter or import in one of seven formats. The functions run the gamut from simple arithmetic operations to curve smoothing, standard deviation, ascending or descending sorts, and regression.

To plot the resulting data, you select from about 30 chart

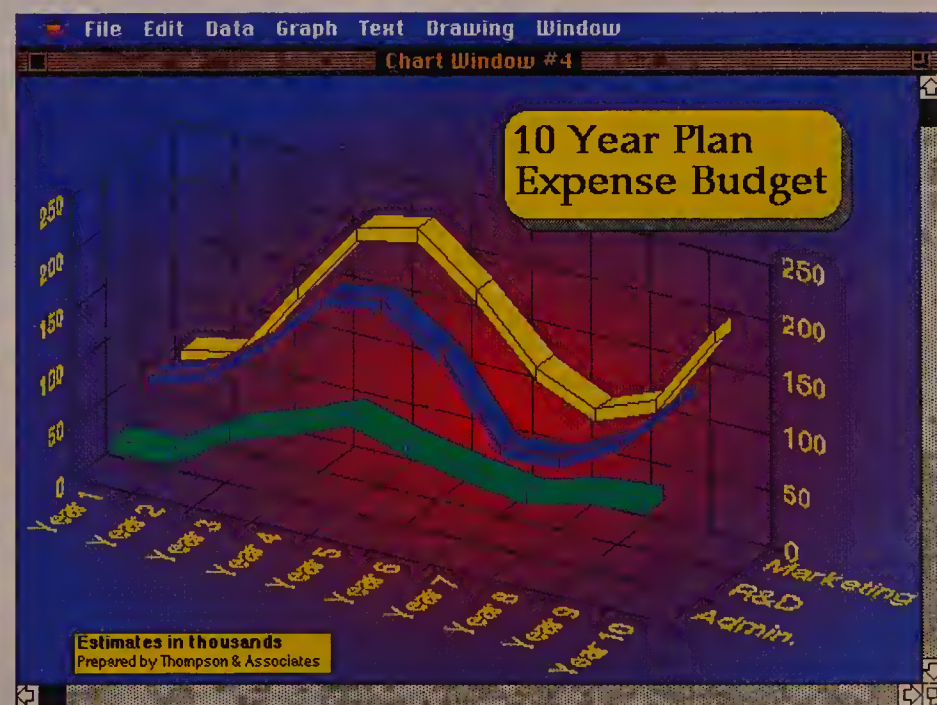
types ranging from typical pie and bar charts to contour charts, Gantt charts, and histograms. Once you have graphed the data, you can refine the layout of the chart with a palette of drawing tools similar to those in MacDraw II; you can add graduated fills or even scale charts down to fit several on each page. You can also adjust the look of any 3-D chart by changing elevation, perspective, or vanishing point. Finished graphs can be exported in Illustrator 1.1, EPS, or PICT formats.

Access also has a basic word processing program, code-named Taste, scheduled to ship in mid-fall. Features include mail merge, column handling, and color for characters and background. In addition, the \$125 word processor comes with enough of DeltaGraph's drawing tools to do a little page makeup.

For further information, contact Access Technology in Monterey, California, at 408/648-4000.

—Nancy E. Dunn

(continues)



DeltaGraph from Access Technology supports charting functions including smoothing, standard deviations, and regressions.

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Remote Control Steals the Show



For giving slide presentations on the Mac, a \$345 remote keyboard emulator called SilentPartner will free you from the keyboard and mouse.

Presentation Electronics' SilentPartner (due to ship this summer) is not the first hand-



Presentation Electronics' SilentPartner remote control lets you run a Mac from 35 feet away.

held remote device to hit the Macintosh market; Kodak introduced its DataShow Presentation Remote last fall. Both products give you the freedom to walk around a room while operating the Mac as far as 35 feet away, and both work by sending the computer a signal that makes it respond as if you've pressed a particular key.

Kodak's \$245 DataShow Presentation Remote is an 18-key device that comes with a set of preprogrammed keyboard equivalents. It lets you move forward and backward in a presentation, or access a particular slide out of sequence. It requires the Apple Desktop Bus (ADB), so Data-

Show Presentation Remote only runs with an SE or a Mac II. The device works with ReadySetShow, Cricket Presents, More II, Microsoft PowerPoint, Aldus Persuasion, and HyperCard—but not with any other software.

SilentPartner's salient feature is its flexibility. Twenty of its 23 keys can be programmed with macros that can be up to 78 keystrokes long. You can choose among three 20-key virtual keypads, giving SilentPartner a total of 60 programmable buttons. It does not require the ADB, so it will work with any model of Mac. Its built-in nonvolatile memory retains its programming when shut off, and it is compatible with all Macintosh software.

SilentPartner comes with a template of buttons preprogrammed for a selection of common applications. It also includes menu-driven software that lets you easily reprogram buttons and create, store, and download new templates.

For further information, contact Kodak in Rochester, NY, 800/445-6325, and Presentation Electronics in Sacramento, CA, at 916/646-3402.

—Mary Margaret Lewis

HyperCard Book Roundup: The Sequel



Since our last look in the February 1989 issue, good books on HyperCard continue to appear. All of them—with different approaches—offer to advance your HyperTalk expertise and guide you in building snazzy stacks. Check these out for your library:

HyperTalk, by Lon Poole.



A slew of new books on HyperCard reflects the broad interest in the subject. Recent releases include the second edition of Danny Goodman's *The Complete HyperCard Handbook* and contributing editor Lon Poole's *HyperTalk*.

Macworld contributing editor Poole's book is a compact, powerful collection of HyperTalk commands, control statements, functions, properties, constants, and system messages, arranged alphabetically for quick reference, with clear explanations and examples (Microsoft Press, 206/882-8080).

The Complete HyperCard Handbook, Second Edition, by Danny Goodman. This comprehensive HyperCard bible has been expanded and updated to support version 1.2 (Bantam Computer Books, 212/765-6500).

XCMD's for HyperCard, by Gary Bond. Written by a member of Apple's HyperCard development team, this book is aimed at programmers who are familiar with *Inside Macintosh* (volumes 1-5). It fully explains how to create and use external commands and functions (XCMDs and XFCNs), with several hundred examples in both MPW Pascal and Lightspeed C

(MIS Press, 503/222-2399).

HyperCard Made Easy, Second Edition, by William B. Sanders. Here both the novice Macintosh user and the experienced programmer will find a concise but thorough explanation of practical stack building. Extensively illustrated with screens and dialog boxes, the book includes many new or revised sections that specifically address HyperCard 1.2 (Scott, Foresman Macintosh Books, 312/729-3000).

HyperCard: The Complete Reference, by Stephen L. Michel. Intended for everyone from beginner to expert, this entry in the total-HyperCard book field starts you out using the Home Card and the Address Stack, proceeds all the way to XCMDs and XFCNs, and gives numerous tips and sample scripts along the way (Osborne McGraw-Hill, 415/549-6610).

Dr. Dobb's Essential HyperTalk Handbook, by (continues)

Introducing Tape Backup With The Attributes Of All Three.



MaxStream™

What does the Max-Stream™ have in common

with the Concorde, a supertanker and the Golden Gate Bridge? Plenty, when you're talking about performance.

With speeds up to 6.75 megabytes per minute, it's the fastest tape backup available. It quickly reduces even the longest, most mundane backup chore into a simple, effortless task.

But don't think that means you give up accuracy for speed. Built-in error correction and data verification guarantee that the data you put on tape will be exactly the same when you restore it – all 150 megabytes.

That's right. MaxStream packs a whopping 150 megabytes on a single industry-standard DC600™ 1/4" cartridge. With that kind of capacity, it's like a supertanker for data. (There's also a 60 megabytes version for smaller applications.)

Either one is perfect for backing up high-end applications like graphics, imaging, database or CAD programs.

And of course, MaxStream works with every popular network. It's the one drive you can trust for backing up all the valuable data on a server.

LAN administrators will also appreciate MaxStream's software. It lets you back up an entire network at pre-programmed times, instead of having to rely on users to back up their data individually.

Even if you're not on a network you'll like our full array of backup and restore features as well as scripting, which allows for automatic, unattended backups. You can run an entire backup at night, or while you're at lunch.

MaxStream also bridges the gap between Macs and IBM PCs® by letting you use the same

DC600 cartridge with both systems. With Archive's Universal Tape Format,™ a tape from one of Archive's tape subsystems can be read and used by the other and vice versa.

MaxStream works with the Mac Plus, SE, II and IIX®. It plugs into the standard SCSI port, and comes with everything you need – cables, software, DC600 cartridge and manual.

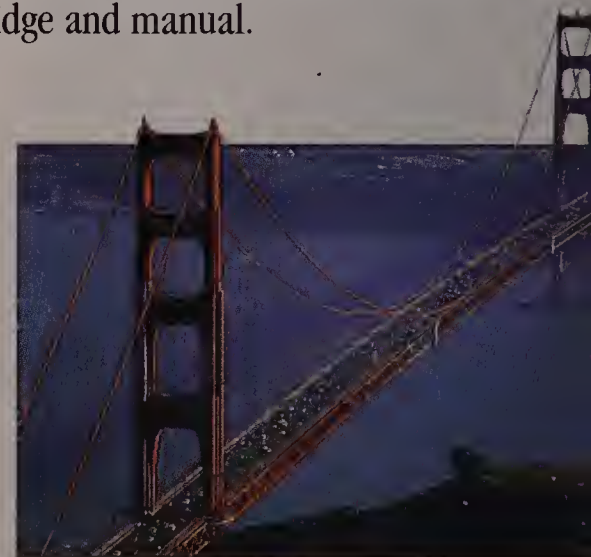
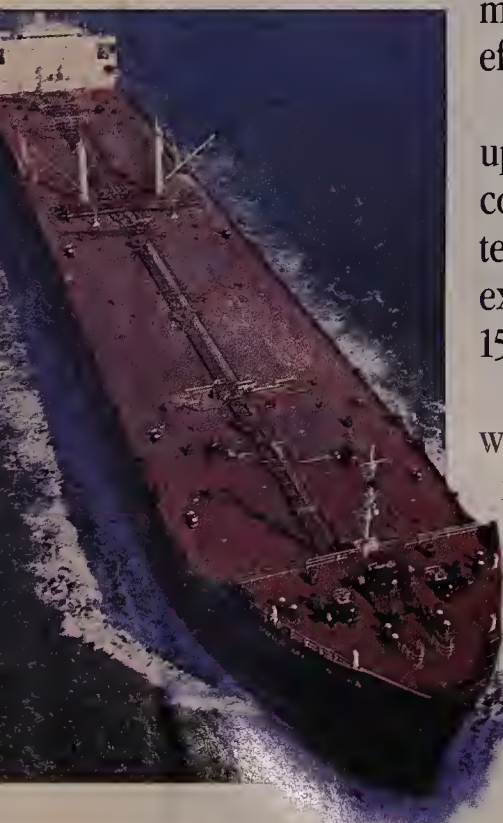
Just as important, when you go with MaxStream, you're getting backup and support from the company that pioneered streaming tape technology back in 1980. Today, there are over one-million Archive tape drives in use throughout the world.

If you're looking for backup that combines speed, capacity and connectivity, it's time to look into MaxStream. For complete information call 1-800-237-4929. Or write Archive Corporation, Data Storage Division, 1650 Sunflower Ave., Costa Mesa, California 92626.

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Circle 3 on reader service card



Michael Swaine, coauthor of *Fire in the Valley*, devotes 155 pages to an in-depth introduction and tutorial. The bulk of the book—the appendixes—is an extensive HyperTalk language reference manual (M&T Publishing, 800/533-4372, 800/356-2002 in California).

Exploring HyperCard, by Steven Anzovin. An accessible, generously illustrated HyperCard guide, this book starts out by going all the way back to Vannevar Bush and his seminal 1945 essay, "As We May Think," for historical context, then thoroughly explores HyperCard tools, scripts, and stack building. A solid chapter on special effects, a HyperTalk glossary, and a resource index are also included. (Compute Books, 919/275-9809).

—Felicity O'Meara

When a Keyboard Isn't Enough

Once in a while a product comes along that defies categorization. In the case of Gestures, developed by Evergreen Technologies, we're talking about software that isn't even intended for consumers. Rather, it's a technology that Mac hardware and software designers can include in their products to gain a competitive edge.

Gestures interprets symbols and commands by observing the motions of any input device—mouse, trackball, stylus on a tablet, or finger tracing on a touch screen. The symbols could be just about anything: characters difficult to enter from a conventional keyboard, such as

math symbols, musical notes, or letters from non-Latin alphabets; a gestural shorthand for repetitious information; or even physical commands, such as crossing out to delete a paragraph. Gestures works by observing the motion from the input device and comparing the direction, speed, and geometry of that motion to those attributes in the list of symbols it knows. Of course, that dictionary of symbols is tailored to the application. Equally important, the software can learn infinite variations on any symbol so individuals need not conform to the machine's idea of what, say, a handwritten *J* looks like.

Jeffrey Siegel, president of Evergreen Technologies, thinks that musical input, education, filling out forms, and CAD are some of the many obvious applications for this technology. For example, Siegel suggests Gestures could bring CAD a little closer to the traditional drafting process. "If you're an electrical

Invoice Date	Date Shipped	Our Order No.	Your Order No.	Terms	F.O.B. Dest.	Salesperson	Shipped Via
06/23/89	06/22/89	32243		30		Jeff	UPS
Quantity Ordered	Quantity Shipped	Description				Price	Amount
24	24	Gummy Bear cases				29.95	718.80
10	0	Jelly Bean barrels				8.50	0.00
35	35	Bubble Gum displays				6.95	243.25
25	25	Sour Ball cartons				7.95	198.75

For ease of data entry, Gestures converts handwritten information (see photo below) into Mac files.

engineer working with a CAD program, you could draw a little squiggle that turns into a resistor symbol from a palette every time you need one."

Gestures could also lead to shortcuts that would work with any Mac application, the way CE Software's QuickKeys lets you substitute a single key for a whole sequence of commands and selections. A HyperCard XCMD version of

Gestures is also available.

Expect to see demonstrations of commercial products incorporating Gesture's capability as early as the Macworld Expo in Boston in August. In the meantime, interested developers can learn more by contacting Evergreen Technologies, Germantown, Maryland, 301/330-8571.

—Nancy E. Dunn



Using Evergreen Technologies' Gestures and a graphics tablet to enter handwritten information onto an order form.

Mac Font Update

The summer of 1989 is seeing a boom in PostScript fonts and font-related software. Adobe is in for some competition as other companies gear up for mass production of fonts. Kingsley/ATF recently released its first four families of PostScript typefaces, to be followed by more later in the year. Image Club plans to release a compact disk containing 600 faces licensed from ITC and other established type companies. In a unique marketing scheme, the fonts on the CD will be locked; buyers will contact Image Club for codes to unlock the (continues)

Dealer.

You Could Buy From A Dealer. When you're ready to upgrade your Macintosh system with peripherals, buying from a dealer is one option. The dollar figures shown here are actual dealer retail prices. Dealers may offer you their "courtesy" discounts, but any way you look at it, you're going to pay more.

\$2,519

\$1895.00

Mass Micro 45MB Removable Hard Drive. The current best-selling removable hard drive utilizes SyQuest technology for dependability. Very practical. Very expensive.

\$429.00

Apple 800K External Floppy Disk Drive. If you absolutely must have the lotus Apple logo on it to make it look like a real deal, buy it. But it's a lot more than a little bit.

\$199.00

DATA FSK MAC 1000. The most popular third-party hard drive for the Macintosh. To the touch, it's very on the price.

Deal.

But You Can Do Better With Ehman. Ehman doesn't have a fancy carpeted showroom and an expensive sales staff. We don't have mark-ups as high as 50% either. What we do have is high-quality peripherals, technical support, and customer service, all at less than half the cost of a dealer.

\$1,097

\$849.00

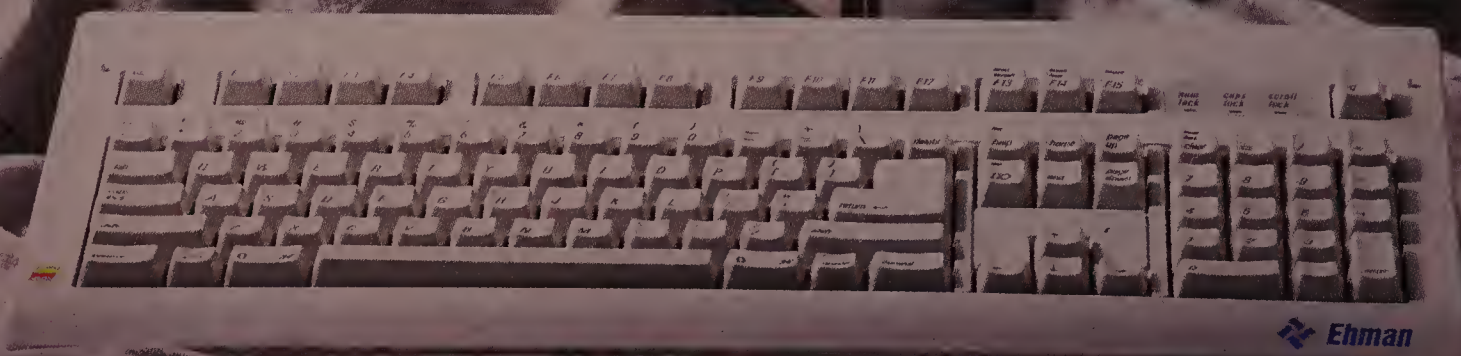
Ehman 45MB Removable Hard Drive. Just introduced, it also has award winning SyQuest technology, and the best features of the Mass Micro except one. The high price.

\$149.00

Ehman 800K Extended Floppy Disk Drive. Also recently introduced, it utilizes proven Fujitsu technology for superior performance and reliability. It will save you a lot of time and nearly 300 bucks.

\$99.00

Ehman Extended Keyboard. The acclaimed keyboard has 104 keys, 12 response keys, a two-line display, and all the functions you want in an extended keyboard, plus one. A functional price.



For the best value go direct to the source. Call Ehman's toll-free number, 1-800-257-1666, U.S., or 1-307-789-3830 world-wide. Overnight delivery via Federal Express, Visa, Mastercard, and American Express welcome. Ehman has been manufacturing quality peripherals since 1985 and backs every item with a 30 day hassle-free return policy and a 2-year limited warranty.

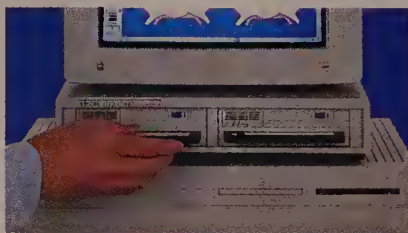
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THE NEW 44MB BERNOULLI TRIUMPHS OVER TIME AND SPACE.



The new 44MB Bernoulli™ sets new standards in performance and capacity for Macintosh® power users—users who want the growth and flexibility of removable storage. Because now Bernoulli offers 22ms effective access time and unlimited storage growth, 44 megabytes at a time.

But performance and capacity are just the beginning. Bernoulli reliability is second to none. Bernoulli's unique design resists head crash, a fundamental problem of conventional hard disks. Bernoulli Disks™ can also withstand over 1000 Gs of shock. In fact, they're the only removable disks that can take a fall from a desktop without data



loss. And Bernoulli Disks and Drives provide product life equal to or better than conventional alternatives.

Backup is easy and fast. Bernoulli lets you make disk-to-disk copies in as little as 3 minutes for 44 megabytes. And since Bernoulli Disks are removable, you can organize your projects on individual disks and keep all of them under lock and key. Now your data can really go places, too. Bernoulli lets you share files between your Mac and PS/2™s, PCs and compatible computers,* and with Bernoulli's ruggedness you can send disks across the office or around the world with-

out concern. And whether for growth or sharing, the 44MB Bernoulli lets you add additional storage for under \$3 per megabyte.**

Those are a few reasons why Bernoulli is the overwhelming leader in removable mass storage, with over 400,000 drive systems and 2.75 million disks in use worldwide. More important, 95% of those users recommend Bernoulli. So see your nearest Iomega Authorized Reseller, or call 800-422-8828 for complete benefits and specifications.

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Circle 260 on reader service card

**Bitstream**

Bitstream Charter
News Gothic
University Roman

The Font Company

Simoncini Garamond
Gill Sans
Vivaldi Script

Image Club

Clearface
Kabel Book
Dom Casual

New font families from Bitstream, The Font Company, and Image Club range from superserious to casual.

fonts they need, paying only for those they use. The Font Company recently released 70 families licensed from URW and plans to offer the entire URW type library by year's end. The Font Company's faces are also offered as EPS outlines for use in Illustrator or FreeHand. Bitstream's MacFontware offers a multiprinter solution with bitmapped fonts in the correct sizes for QuickDraw printers, as well as PostScript outlines for PostScript printers.

Specialty fonts of note include Bear Rock Software's Code 39 and UPC-A bar-code fonts; four musical notation fonts from Coda Music Software; and augmented versions of several LaserWriter favorites from EmDash, which offers tailored versions of Times, Helvetica, Courier, and Avant Garde, each of which provides fractions, superior numerals for prices, and several styles of bullets.

Some new digital type foundries will be joining

Altsys' classic Fontographer. Kingsley/ATF's ATF Type Designer I is expected to ship this summer, while Letraset's program, code-named Fred, is due out late this year. Expect Letraset's program and a future version of Fontographer to support Apple's new font format. If you're not up to designing a font from scratch, Altsys' The Art Importer converts Mac graphics in any of several formats into PostScript characters that can be keyed in.

Finally, in the special-effects department, joining Letraset's LetraStudio and Brøderbund's TypeStyler are Emerald City Software's Smart Art and Linographics' LaserOptics. In addition, you can add effects to Postcraft International's Laser FX with Laser FX-Pak expansion packages.

For further information, contact Altsys Corporation in Plano, Texas, at 214/424-4888; Bear Rock Software in Placerville, California, at 916/622-4640; Bitstream in Cambridge, Massachusetts, at 617/497-6222; Brøderbund Software in San Rafael, California, at 415/492-3200; Coda Music Software in Bloomington, Minnesota, at 612/854-1288; EmDash in Northfield, Illinois, at 312/441-6699; Emerald City Software in Atherton, California, at 415/368-8303; The Font Company in Phoenix, Arizona, at 602/996-6606; Image Club Graphics in Calgary, Alberta, Canada, at 403/262-8008; Kingsley/ATF Type Corporation in Tucson, Arizona, at 602/325-5884; Letraset USA in Paramus, New Jersey, at 201/845-6100; Linographics in Orange, California, at 714/639-0511; or Postcraft International in Valencia, California, at 805/257-1797.

—Erfert Fenton

Radius Strikes a Color Chord



To support the color capability of the Mac II family, Radius has begun shipping its DirectColor series of 16- and 24-bit display boards. The boards are capable of showing two pages of photorealistic color on appropriate monitors and are compatible with Apple's recently unveiled 32-bit QuickDraw.

The DirectColor boards have a full chunky architecture for faster throughput and

palette of 16.7 million colors, and a 72Hz refresh rate that eliminates flicker. The 16-bit board can be upgraded to 24 bits by adding 1MB of video RAM for a total of 3MB.

The Radius DirectColor/16 Interface has a suggested list price of \$3695, while the DirectColor/24 Interface lists for \$4995. Radius also announced a Mac SE/30 version of its monochrome display board for its Two-Page Display monitor. The display and board together will retail for \$2100. For more information, call Radius in San Jose, California, at 408/434-1010.



Screen output from Radius' DirectColor/24 Interface, a 24-bit board compatible with 32-bit QuickDraw.

support the NuBus' block-transfer mode, which permits data transfer at up to 37.5MB per second. The block-transfer capability is intended to work with any future graphics input board that can act as a bus master and also support the block transfer mode. Radius declined to confirm whether it currently has any plans for such a product.

Both boards offer 1152-by-882-pixel resolution, a

Speeding Up SCSI Transfers



Designed to speed Mac II file transfers to and from your SCSI hard disk, tape drive, or optical storage device by as much as 500 percent, Golden Triangle's Pronto board supports both internal and external drives.

(continues)

Fast Statistics.

3-D and Dynamic Graphics!

Three-dimensional full color scatterplots with surface smoothing, and sophisticated dynamic graphics like scatterplot brushing and movies.

Because you don't have time to waste.

You don't have time to read a 1000 page manual, to play games, to wade through a pile of confusing menus.

You have lots of data.

You need graphs, tables, financial projections, surveys. The report is due tomorrow and the stat package you thought had everything can't do the job.

Now you can do it.

The company that brought professionals "the best statistics package on the Macintosh"* introduces the *easiest*: FASTAT.

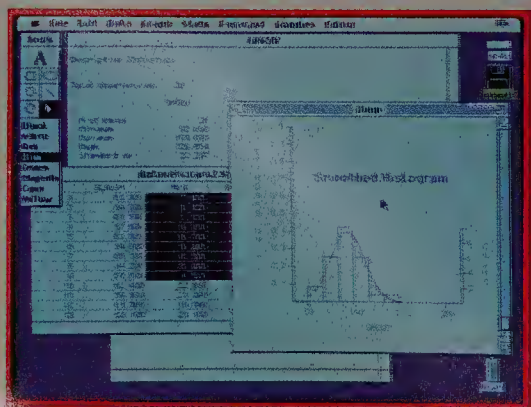
Designed just for the Macintosh, FASTAT makes high-powered, accurate statistics easy.

You can do dependent and independent t-tests, time series analyses, factor analysis, two-way and n-way tables, correlations, nonparametric tests, regressions, analysis of variance and covariance, exploratory data analysis — even if you've never done them before.

You can also create full-featured graphics such as X-Y plots, bubble plots, line plots, histograms, box-plots, stem-and-leaf diagrams, autocorrelation and time series plots, as well as state-of-the-art displays, like scatterplot matrices.

Some of the graphs are only a click away.

Click on a variable name, and you get a histogram or a box plot of the variable. Click on a regression output or a cell in a correlation matrix, and you get a scatterplot of the variables.



Need to customize a graph?

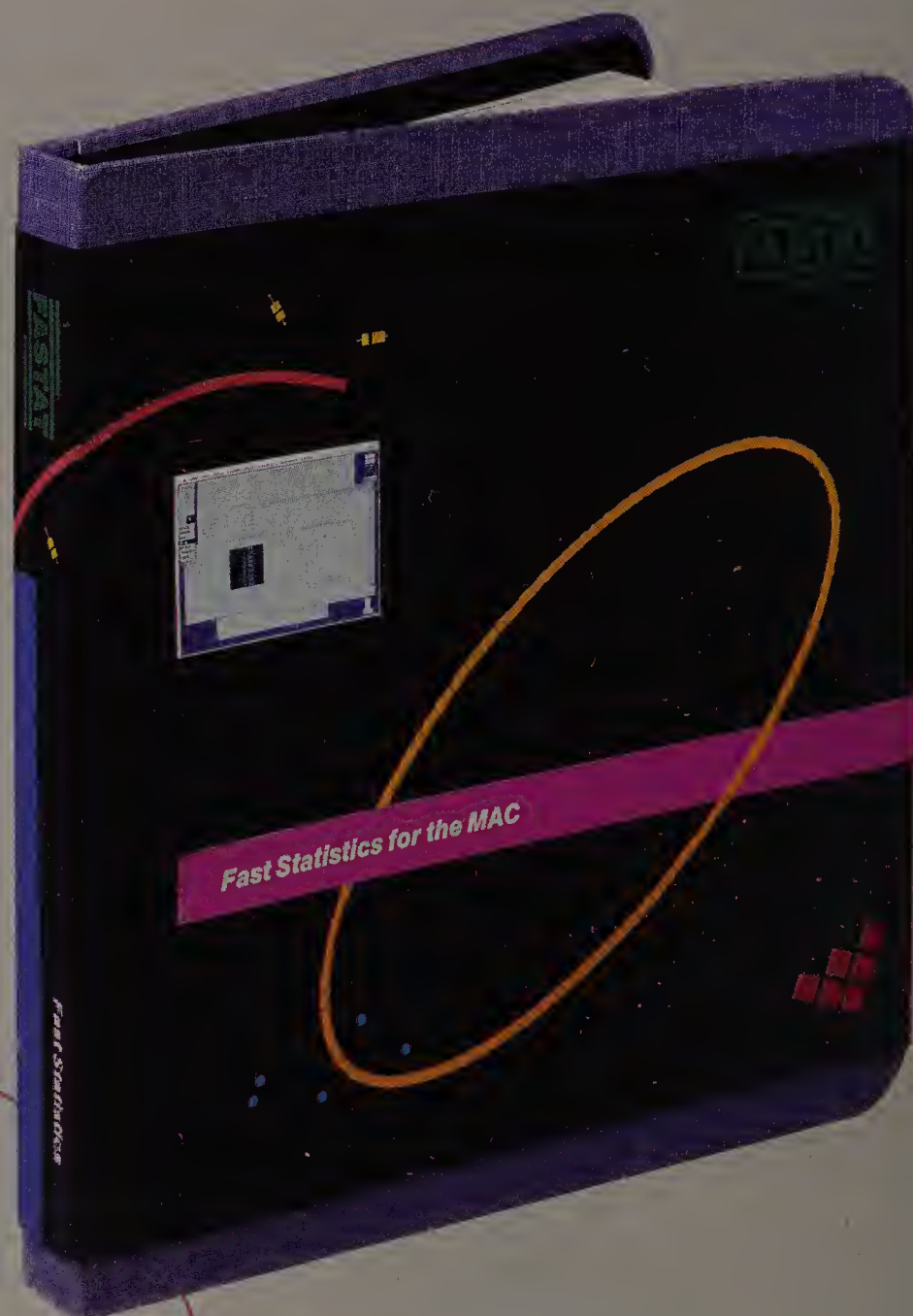
With FASTAT's MacDraw-like tools you can color, draw, add text, and move things.

Need help understanding a statistic?

FASTAT's "pop-up tutor" tells you what the numbers mean.

Need reports?

FASTAT's built-in text editor lets you scroll through results, cut and paste, change fonts, add explanatory notes, and save your work.



FASTAT

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Systat. Intelligent software.

Call or write for further information:

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1800 Sherman Avenue, Evanston, IL 60201

312 864.5670 FAX 312 492.3567

System requirements: 1 megabyte of memory and hard drive.
Mac II version available. Unlimited free technical support.

Dealers circle 492 on reader service card
End users circle 491 on reader service card

*MacWeek September 13, 1988

**Suggested Retail Price



Golden Triangle's pronto board accelerates SCSI transfers.

Pronto uses synchronous (clocked) SCSI, which is faster than the asynchronous SCSI native to the Mac. This NuBus board also uses a byte-packing algorithm and cache memory to sling data around your system.

To install Pronto, you simply plug it into the NuBus; operation is transparent. Available now, the board has a suggested list price of \$745. For further information, call Golden Triangle Computers in San Diego at 619/279-2100.

New CAD on the Block

TWith the Macintosh II gaining acceptance in architecture, engineering, and construction firms, more and more software for those professions has come on the market. The latest entry is MicroStation Mac from Intergraph, a Fortune 500 firm that pioneered CAD software on minicomputers. At \$3300, the program offers unlimited drawing size, 450 tools and functions, numerous input and output alternatives, and Oracle databases for graphics and for basic administrative tasks such as tracking materials and billing. (Support for Ingres and

Informix database managers is planned.) At the same time, MicroStation Mac provides an entry-level door to Intergraph's VAX-based Interactive Graphics Design Software (IGDS), as well as transparent file portability between MicroStation versions for the Mac, IBM PC, and UNIX workstations.

MicroStation Mac can simultaneously display two- and three-dimensional drawings, with both wire-frame and shaded models in the same drawing. The program works concurrently on up to six monitors, with as many as eight active windows showing different views of the design at the same time. An unlimited undo/redo capability lets designers backtrack for any number of steps.

This power doesn't come at the expense of ease of use. Though MicroStation Mac's many features take some time to learn, the program resembles other Mac programs in its use of tool palettes. The program lets you enter commands from the keyboard in an optional command window, but you can stick to the mouse without sacrificing any power.



MicroStation Mac brings high-end architecture, engineering, and construction CAD functions to the Mac II family and the SE/30.

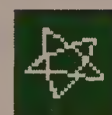
MicroStation Mac works on the Mac SE/30, Mac II, or Mac IIx. The program requires at least 2MB of RAM (4MB is recommended), and hard disk capacity of at least 40MB. For further information, contact Intergraph in Huntsville, Alabama, at 205/772-2194.

—Nancy E. Dunn



DXI engineer Jim Simpson designs color copiers with MicroStation Mac. He says the program is "almost like having the mainframe system on the Mac."

CD ROM Starts Spinning in the Mac World



When Apple announced its CD ROM drive a little over a year ago, there were few titles for it and little real benefit to the user. With many of the obstacles to acceptance now gone, however, CD ROM is

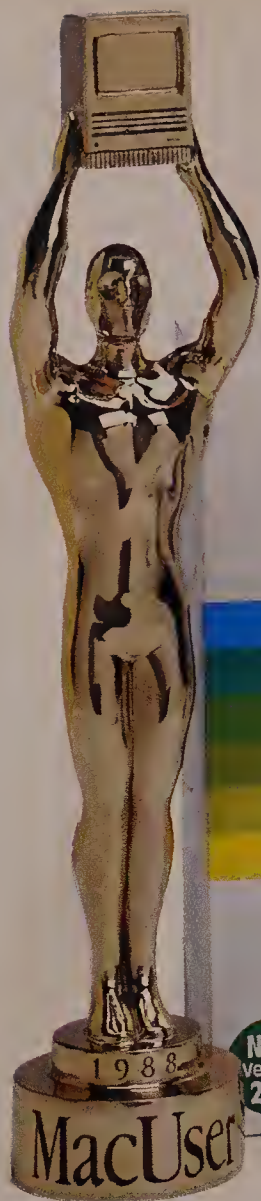
fast becoming a viable medium for the distribution of software, graphics, and data.

For example, a mastering technique already demonstrated by Discovery Systems allows CD ROM developers to produce disks that will work with either a Mac or an IBM PC. The company's sampler

combines music with a HyperCard stack of lyrics and images that play along with the music. On a PC, the disk provides a music-selection menu, which is used to control the playing of the songs on the disk.

Toshiba has announced a CD ROM subsystem that can be used on either a Mac or a PC, allowing a dealer to stock a single unit. This approach permits economies of scale that should eventually reduce the cost of CD ROM drives. Further, a SCSI adapter from CSM should also help break down barriers to acceptance by allowing a PC to use a Mac CD ROM.

The number of CD ROM software titles continues to grow. A pair of three-pack bundles being distributed by Ingram Micro D combines VideoWorks from MacroMind, BMUG PD-ROM (Public Domain Read-Only Memory) which includes both public domain software and shareware from BMUG (Berkeley *(continues)*



Best Performer!



FoxBASE+/Mac: The Most Celebrated Mac DBMS Now Includes a Powerful Report Writer!

**New
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New FoxBASE+/Mac Version 2.00 is here—and stealing the show! In its first year, FoxBASE+/Mac won more awards—both in the U.S. and Europe—than any other DBMS ever created for the Macintosh! And Version 2.00 is faster and more powerful than ever—packed with innovative new features and language enhancements!

New FoxReport!

FoxReport lets you create virtually any columnar or free-form report—without any programming! FoxReport includes:

- **Page Layout:** Designate many layout settings for your report: number of columns, left margin setting, column width, space between columns, measurement size for each page, and more!
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Footer, then bring in other bands like Title, Summary, Column Headers and Footers, etc.

- **Object Menu:** Control the Type Font, Sizes and Styles of text objects. Fill and Pen options let you change the color and shading of almost every object!
- **Page Preview:** "What-You-See-Is-What-You-Get" design ensures that the report on your screen is *exactly* as it will appear in print!
- **Label Generator:** Create labels of almost any size and configuration. You can even include pictures *anywhere* on the label space!

New Features!

- **Enhanced XCMD/XFCN Support:** Load up to 16 external XCMD's and XFCN's, then access them directly from within FoxBASE+/Mac 2.00 programs!
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FoxBASE+/Mac 2.00's Multi-User version allows complete data and application sharing between networked Macs and PCs! (when used with FoxBASE+/LAN). It also runs on the most popular network systems: AppleShare, Novell and 3Com! . . . *And It's Faster Than Ever!*

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FoxBASE+/Mac Version 2.00 is the *new* Leader of the Mac! And at only \$495 (\$695 for Multi-User), it's a phenomenal bargain! If you're already a FoxBASE+/Mac registered user, you can upgrade to Version 2.00 for just \$75!

To order your copy (or ask for a **FREE** demo disk), call (419) 874-0162. Or visit your local quality software dealer.

After all, when it comes to the Macintosh, *Nothing Runs Like a Fox!*

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Fox Software

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Perrysburg, OH 43551 Telex: 6503040827 Fox



Macintosh user group), and Optical Media International's Universe of Sounds CD ROM database of sound effects, into one \$249 retail package. A second package combines clip art from Comstock Desktop Stock Photography; Multi-Ad Services' ProArt Trilogy Clip Art; and Xiphias Corporation's National Directory, a listing of telephone and fax numbers for many major companies.

Development tools announced by Apple and others will reduce the cost of developing CD ROM disks for the Macintosh. Apple has also announced HyperSource, a mastering system that automates the creation of graphic databases and puts graphics and reference information into a HyperCard stack. In addition, Apple has unveiled its HyperCard CD Audio Toolkit, which provides extensions that allow stack control, interaction, and random access to audio tracks on any compact disk. Apple has reduced the cost of disk production, and this should clear the way for a large number of titles to become available very soon. This, in turn, could make con-

necting a CD ROM unit to *your* Mac a necessity. For more information, call BMUG in Berkeley, California, at 415/849-9114; Comstock in New York City, at 212/353-8686; Discovery Systems in Dublin, Ohio, at 614/761-2000; Ingram Micro D in Santa Ana, California, at 714/540-4781; MacroMind in Chicago, at 312/871-0987; Multi-Ad Services in Peoria, Illinois, at 309/692-1530; Optical Media International in Los Gatos, California, at 408/395-4332; Toshiba America in Irvine, California, at 714/583-3000; or Xiphias Corporation in Marina Del Rey, California, at 213/821-0074.

—Mark Brownstein

Statistics, Anyone?



SAS Institute, creator of a very popular data-management and statistical-analysis program for mainframes and minicomputers, has introduced a Mac program that performs some of the same tasks. While it's not a Mac version of SAS, JMP (pronounced *jump*) lets nonstatisticians graphically explore



BOB EPSTEIN

David Morgenstern uses SAS's JMP data manipulation software in his work at Weststat in Rockville, Maryland.

data to discover relationships that wouldn't be apparent in spreadsheet form.

This approach is not new to the Mac; several other programs encourage graphic data exploration, and Odesta's DataDesk Professional shares many of JMP's features (see "Picturing Statistics," April 1989). Like DataDesk, JMP lets you plot data as a three-dimensional cluster of dots that you can spin on screen and examine from all angles to look for data that depart from the norm.

JMP's innovations include the capability to generate leverage plots and mean circles plots from x/y graphs. In addition, the software will allow importing and exporting files in the SAS transport format, which provides data compatibility with the company's flagship product.

Site licenses for JMP will cost under \$500 for one workstation, and discounts will be available for volume installa-

tions. JMP is scheduled to ship this fall. For further information, contact the SAS Institute in Cary, North Carolina, at 919/467-8000.

—Nancy E. Dunn

Hope for Desktop Color Separations



Despite the explosion of new hardware and software for desktop publishing, techniques for preparing color photographs and graphics for printing on the Mac have so far not met the standard set by more traditional methods. But there's hope on the horizon, in the form of new software developed in Spain.

Marcel Coderch, director of research and development for Grupo Anaya in Madrid, says the publishing company has developed a program that converts the Mac's RGB color to printer's CMYK color with such precision that printed

(continues)



Apple's HyperCard CD Audio Toolkit provides HyperCard stack control, interaction, and random access to sounds on CDs.

Napoleon Bonaparte



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image clarity and color gradations rival the output of high-end systems such as Scitex.

In addition, the software appears to completely eliminate the moirés that have troubled printers ever since color lithography was invented. These wavy patterns result from very slight misalignment of the screens used to produce the cyan, magenta, yellow, and black dots. Coderch's method does away with the screen rotation that traditionally produces the regular array of dots, thereby forestalling the chance to create moirés.

Mac Product developers, such as Barneyscan of Berkeley, California, are currently testing the software, and Grupo Anaya is considering how to distribute it. It may be sold to consumers and printing technicians, or it may be licensed to Mac software and hardware manufacturers.

For further information, call Grupo Anaya in Madrid, Spain, at 011/341-742-9399.

—Nancy E. Dunn

Survey Says: The '030



For this month's survey, we took a look at which Macintosh models our readers are currently using, and at what percentage of them say they will buy one of Apple's new 68030-based machines.

As Apple and many pundits have predicted, the Macintosh IIcx looks to become one of the most popular Macs ever. Twenty-three percent of those responding to our survey said they expect to buy at least one IIcx in the next 12 months. However, the six-

slotted members of the Mac II family fared less well, according to our version of Family Feud. The IIx and the 68020-based Mac II each garnered only a 7 percent intent to purchase. Only 7 percent of readers who plan to buy a Mac in the next year say they anticipate using more than 3 slots.

In Apple's compact line, the SE/30 leads the way, tallying 18 percent of respondents who plan to purchase, while 12 percent said they would buy an SE. Only 6 percent spoke up for the Mac Plus, adding some credence to industry rumors that the once-popular and widely installed machine may be headed for Mac Valhalla.

When you total the percentage of respondents who said they would buy an '030-based Mac system in the next 12 months, you come up with a whopping 48 percent—indicating, if there was any doubt, that Mac users care very much about performance. In fact, in a separate question on the sur-



Ricoh and Orchid both have recently introduced external fax modems with 9600-baud transfer rates.

vey, 24 percent of SE and II-Series users said they intend to buy a 68030-based accelerator board. Interestingly, 46 percent of readers polled said they had no plans to buy any Mac in the next 12 months.

Incoming Faxes



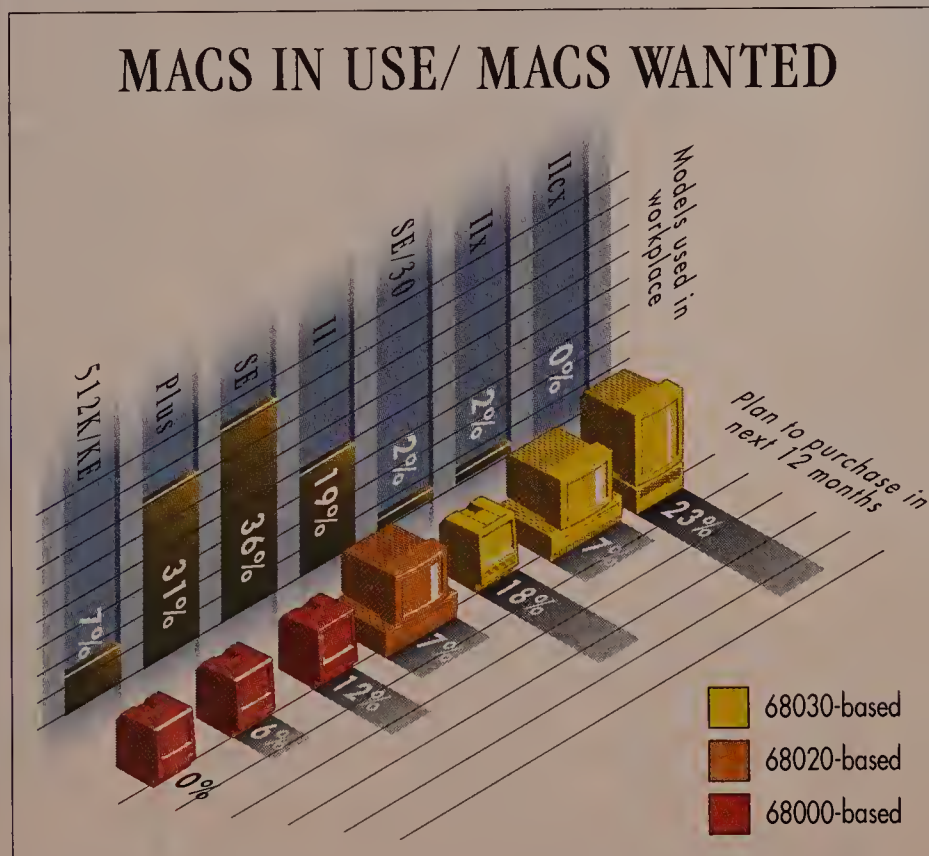
Two or more companies have decided to offer facsimile modems for use with the Mac. Ricoh Corporation, known for its copiers and facsimile machines, will shortly be ship-

ping the DX1 fax modem for the Mac, and Orchid Technology has announced its own MacFax modem.

The 9600-bps Ricoh DX1 includes two phone jacks and software that let you use a regular fax machine as a scanner for the Mac. DX1 software also serves as a phone-line management tool—you can preset the device to answer the phone (voice or fax) and to direct faxes either to a regular fax machine for hard copy or to the Mac's hard disk for storage. Also, the fax software can be used in a stand-alone mode, supporting Mac-to-Mac file transfers at speeds of up to 57,600 bps.

Orchid Technology's MacFax is also a 9600-bps fax modem, but the functions of a 9600-bps data modem are included in the same unit. Bundled with BackFax software from Solutions International, the MacFax is capable of receiving and sending faxes in the background on the Mac and can also exchange Mac files with Apple's AppleFax modem. For more information, call Orchid in Fremont, California at 415/683-0300 or Ricoh's Systems Facsimile Department in West Caldwell, New Jersey, at 201/882-2535.

—Dave Kosiur



A surprising 48 percent of survey respondents said they would buy a 68030-based Macintosh in the next 12 months.

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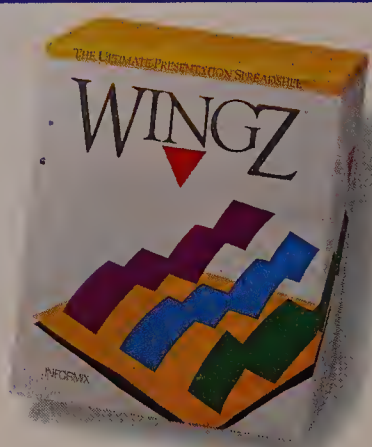
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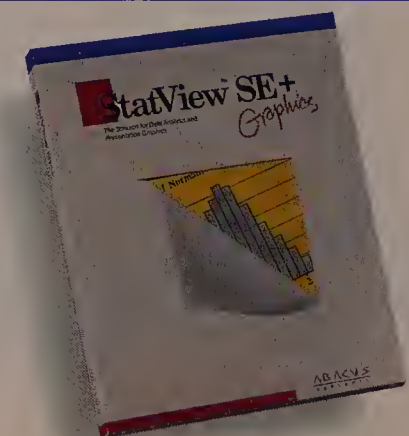
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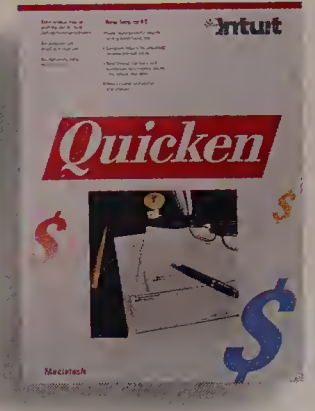
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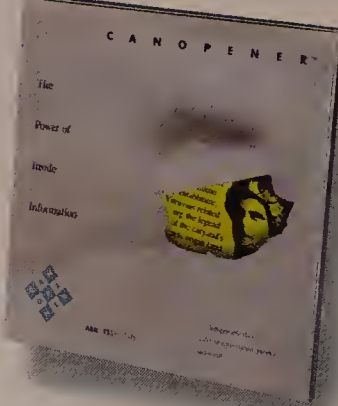
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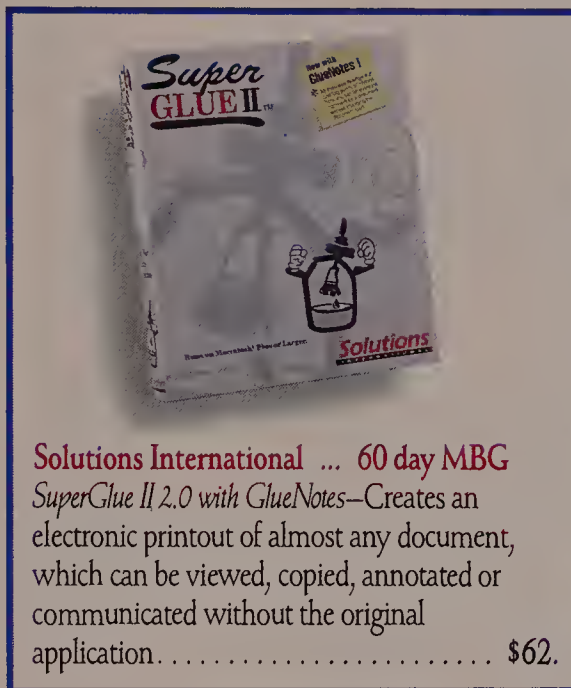
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4700	BigThesaurus 1.0	59.
1767	Comment 2.0	59.
1768	Coach Professional 3.0C	115.

Electronic Arts

1543	Thunder II 1.0 (Batteries Included)	52.
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★ **Lundeen & Assoc.** ... 60 day MBG

2684	WorksPlus Spell 2.0	46.
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★ **Microlytics** ... 60 day MBG

2733	Word Finder 2.0	36.
4870	Electronic WordFinder 220	79.

★ **Microsoft** ... 30 day MBG

2885	Write 1.0	79.
2882	Word 4.0	255.

★ **Niles & Associates** ... 30 day MBG

5048	EndLink 1.0	59.
4602	EndNote 1.1.1	82.

★ **Preferred Publishers** ... 30 day MBG

4781	Vantage 1.0	59.
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★ **Sensible Software** ... 30 day MBG

4692	BookEnds 1.0E	53.
3375	Sensible Grammar 1.1D	53.

★ **Symantec** ... 30 day MBG

3422	More II 2.01	255.
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★ **Symmetry** ... 30 day MBG

4504	Acta Advantage 1.0	65.
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★ **T/Maker** ... 30 day MBG

3639	WriteNow 2.0	109.
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★ **WordPerfect** ... 60 day MBG

3800	WordPerfect Mac 1.0.2	185.
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Working Software

3792	Spellswell 2.0G	\$45.
4693	Quick Letter 1.0	75.

MUSIC & EDUCATION

★ **Ars Nova** ... 60 day MBG

1215	Practica Musica 2.1	75.
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★ **Bogas Productions** ... 60 day MBG

1461	Studio Session 1.2 SE	49.
4255	Super Studio Session 2.0	69.

Bright Star Technology

1402	Alphabet Blocks 1.0	32.
3961	Talking Tiles 1.0	69.

Broderbund Software

4314	Type! 1.0	20.
1423	Jam Session 1.1 (CP)	30.
1422	Geometry 1.2 (CP)	59.
4067	Calculus 1.2 (CP)	59.

Coda Music Systems

4367	MacDrums 1.01 (CP)	31.
4483	Perceive 1.0	50.

Davidson & Associates

1734	Math Blaster! 1.0 (CP)	27.
4978	Speed Reader II 1.0 (CP)	36.

Electronic Arts

4619	Mavis Beacon Typing 1.2B (CP)	33.
1846	Deluxe Music Construction Set 2.5	84.

First Byte

5294	The Puzzle Storybook (ages 3-8)	27.
5293	Dinosaur Discovery Kit (ages 3-8)	27.
3941	SmoothTalker 2.1	33.

★ **Great Wave** ... 30 day MBG

2277	TimeMasters 1.0	22.
2276	KidsTime 1.2	26.
4334	NumberMaze 1.0	27.
2273	ConcertWare+ 4.0	39.
2271	ConcertWare+ MIDI 4.0	79.

Learning Company

2670	Reader Rabbit 2.1 (CP)	32.
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Software Ventures ... 30 day MBG

MicroPhone II 3.0—The newest version of the top telecom software adds ZMODEM; on-screen color icons; and color and sound support for XCMDs and XFCNs. ... \$219.

Want it sooner?

Mindscape

2748 The Perfect Score: SAT 1.0 \$46.

★ **Personal Training Sys. ... 60 day MBG**

MacConnection carries the entire PTS collection. A partial listing follows.

4946 Excellerate (beginner level) 29.

5194 HyperEasy (beginner level) 39.

5196 MasterWorks (beginner level) 39.

5278 Learn FileMaker (beginner level) 39.

4852 PageTutor (beginner level) 39.

4947 LearnWord (beginner level) 39.

★ **Simon & Schuster ... 60 day MBG**

3305 Typing Tutor IV 1.2 35.

★ **Spinnaker ... 30 day MBG**

2329 SAT Score Improvement 1.0 (CP) 57.

★ **Springboard ... 30 day MBG**

4493 Atlas Explorer (CP) 28.

★ **Think Educational ... 60 day MBG**

3615 MacEdge II 1.0 (CP) 27.

★ **Unicorn ... 30 day MBG**

3751 Animal Kingdom (CP) 27.

3756 Math Wizard (CP) 27.

ENTERTAINMENT

Access Software

4655 World Class Leader Board Golf 28.

Activision

4475 Quarterstaff (CP) 30.

4486 Manhole 30.

5127 Manhole CD ROM 35.

4592 Zork Zero (CP) 35.

Broderbund Software

4099 Shufflepuck Cafe (CP, air hockey) 24.

4229 Where/World Carmen Sandiego? (CP) 27.

5233 Where/USA Carmen Sandiego? (CP) 30.

4965 Auto Duel (CP) 27.

4966 SimCity (CP) 27.

1421 Ancient Art of War (CP) 27.

4540 Ancient Art of War at Sea (CP) 27.

Bullseye

1544 Ferrari Grand Prix (CP) 32.

4074 P51 Mustang Flight Simulator (CP) 32.

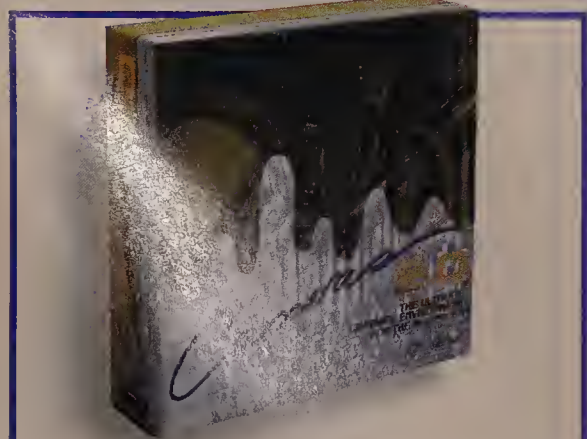
★ **Casady & Greene ... 60 day MBG**

2268 Crystal Quest 2.2C 26.

4119 Crystal Quest w/Critter Editor 2.2C 42.

★ **Discovery Software ... 30 day MBG**

4408 Arkanoid 27.



Deneba ... 30 day MBG

Canvas 2.0—The only object-oriented draw program to receive a 5 mouse rating from MacUser magazine. Includes continuous multi-point Bezier curves, and instant auto-trace conversion of bitmapped images . . . \$159.

Electronic Arts

1842 Chessmaster 2000 (CP) \$28.

4064 Chuck Yeager Flight Simulator (CP) 32.

4588 Life & Death (CP) 32.

4945 The Hunt for Red October (CP) 32.

Epyx

2037 Sub Battle Simulator 29.

4660 Sub Battle Simulator for Mac II 29.

MicroProse

4697 Pirates! (CP) 32.

★ **Microsoft ... 30 day MBG**

2868 Flight Simulator (CP) 33.

Miles Computing

2765 Fool's Errand (CP) special 27.

5253 The Puzzle Gallery 27.

2767 Harrier Strike Mission II (CP) 32.

Mindscape

4083 Balance of Power 1990 (CP) 30.

5290 Captain Blood (CP) 30.

3987 Colony (CP) 30.

4596 Deja Vu II (CP) 30.

5252 Gauntlet (CP) 30.

PCAI

3144 MacGolf 2.0 (CP) 35.

4320 MacGolf Classic (CP) 54.



Chang Labs ... 60 day MBG

Special—Rags-to-Riches GL 3.1—Thru August 31, 1989 place an order of \$250 or more (any products) from MacConnection and you may also purchase this top-rated accounting module for only \$19. Limit 1 per customer.

4321 Lunar Rescue (CP) 34.

4517 Road Racer (CP) 39.

Sierra On-Line

3397 Leisure Suit Larry (CP) 23.

3396 King's Quest III (CP) 29.

★ **Silicon Beach ... 60 day MBG**

3502 Beyond Dark Castle special 27.

3501 Apache Strike 32.

3503 Dark Castle 32.

★ **Simon & Schuster ... 60 day MBG**

3303 Star Trek Kobayashi Alternative (CP) 24.

Sir-Tech

3347 Mac Wizardry (CP) 35.

★ **Softstream Int'l., Inc. ... 60 day MBG**

4071 Mac•Man (w/adaptor) 23.

4072 The Solitaire DA 23.

4995 Cribbage Tutor 26.

4073 Colour Billiards 38.

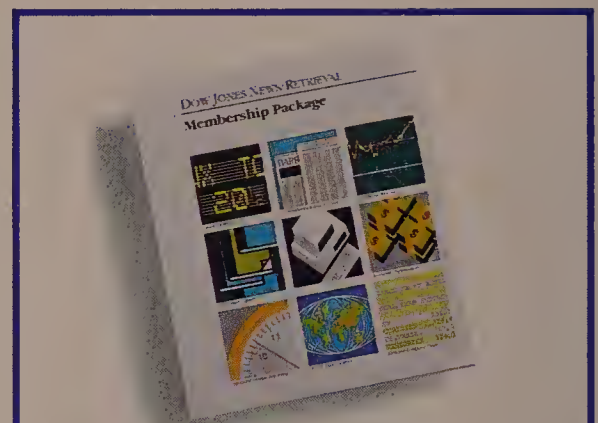
★ **Spectrum Holobyte ... 30 day MBG**

4175 Solitaire Royale (for Mac SE) 20.

3464 Tetris 20.

4472 Tetris (color version) 24.

3462 PT-109 26.



Dow Jones ... 30 day MBG

News/Retrieval Membership Package—Allows off-line set up of personalized reports to retrieve and analyze key data from Dow Jones News/Retrieval's 50+ databases. Includes five free hours of service \$24.

3459 Falcon 2.0 32.

★ **Spinnaker ... 30 day MBG**

2328 Sargon IV (CP) 29.

★ **Springboard ... 30 day MBG**

4988 Hidden Agenda 36.

★ **SubLogic ... 60 day MBG**

4698 Jet (CP) 32.

NETWORKS & COMMUNICATIONS

★ **Abaton ... 30 day MBG**

4589 InterFAX Modem 359.

★ **CE Software ... 60 day MBG**

5172 QuickMail (1 user add-on) 45.

5174 QuickMail (5 user Pak) 175.

5173 QuickMail (10 user Pak) 259.

★ **CompuServe ... 60 day MBG**

1676 CompuServe Information Service 24.

1673 CompuServe Navigator 2.1 45.

1674 Standard Service/Navigator Bundle 59.

★ **DataViz ... 60 day MBG**

1823 MacLink Plus/PC 4.0 139.

4842 MacLink Plus/Translators 4.0 115.

★ **Dove Computer ... 60 day MBG**

4939 FastNet III 450.

4938 FastNet SE 450.

4937 FastNet SCSI 925.

★ **Dow Jones ... 30 day MBG**

5295 News/Retrieval Membership Pack 24.

1785 Desktop Express 1.03 95.

1786 Market Manager Plus 2.0 189.

★ **Farallon Computing ... 30 day MBG**

4208 Timbuktu 2.0.1 65.

4866 Timbuktu Remote 1.0.1 195.

4867 Timbuktu 30-Pack 2.0.1 1395.

2201 TrafficWatch 1.08 139.

2203 PhoneNET PLUS (DIN-8) 35.

2204 PhoneNET PLUS (DB-9) 35.

4869 PhoneNET Connector 10-Pack 225.

4868 PhoneNET Repeater 325.

2206 PhoneNET StarController 1199.

★ **Freesoft ... 60 day MBG**

2219 Red Ryder 10.3 54.

Hayes

2300 Smartcom II 3.1 88.

2307 Smartmodem 2400 429.

5170 2400M (internal) 419.

5169 2400M (internal w/Smartcom II) 459.

Expo-se yourself to

Insignia Solutions

4089 SoftPC 1.3 \$249.

Intel Corporation

5119 2400 Baud External Modem 179.

★LaCie, Ltd. ... 30 day MBG

4975 LaCie Utilities 1.0 (Includes SilverLining, SilverPlatter, and SilverServer) 89.

★Lamir ... 30 day MBG

4984 Acknowledge 1.0 329.

★Microsoft ... 30 day MBG

2875 Microsoft Mail 1.37 (1-4 users) ... 195.

2872 Microsoft Mail 1.37 (5-10 users) ... 325.

2873 Microsoft Mail 1.37 (11-20 users) ... 489.

2874 Microsoft Mail 1.37 (21-32 users) ... 639.

★Nuvotech ... 60 day MBG

3000 TurboNet ST (DIN-8) 30.

3001 TurboNet ST (DB-9) 30.

5277 TurboBridge 359.

★Practical Peripherals ... 30 day MBG

3100 1200 Baud External Modem 77.

3102 2400 Baud External Modem 179.

3089 Mac Communications Pack 1.5 ... 225.

★Shiva ... 30 day MBG

3444 NetSerial X232 289.

4347 NetBridge 349.

4942 TeleBridge 349.

3443 NetModem V2400 479.

★Software Ventures ... 30 day MBG

3454 MicroPhone 1.5 119.

3455 MicroPhone II 3.0 219.

★Solutions Int'l. ... 60 day MBG

4308 BackFAX (reqs. Apple FAX modem) ... 125.

★Synergy ... 30 day MBG

3130 VersaTerm 4.0 89.

3131 VersaTerm-PRO 3.0 179.

★TOPS ... 30 day MBG

3723 TOPS Mac 2.1 149.

3726 TOPS for DOS 2.1 119.

3724 NetPrint 2.0 119.

4715 InBox Connection Mac 2.2 75.

4714 InBox Starter Kit 2.2 199.

4188 TOPS Teleconnector (DIN-8) 29.

4598 TOPS FlashBox 125.

3725 TOPS Repeater 129.

3720 TOPS Flashcard 169.

★Traveling Software ... 60 day MBG

3729 LAP-LINK Mac 2.0 83.

INPUT/OUTPUT

Caere

4476 OmniPage 1.1 \$559.

★Cutting Edge ... 30 day MBG

3988 CE 105ADB Keyboard w/QuickKeys ... 135.

★Datadesk ... 30 day MBG

1819 MAC-101 Keyboard (beige) 145.

1820 MAC-101 Keyboard (platinum) ... 145.

1821 MAC-101 Keyboard (ADB) 145.

Foreign Keyboards available call

★Kensington ... 30 day MBG

2576 Turbo Mouse for Mac Plus 3.0 ... 109.

2547 Turbo Mouse ADB 3.0 109.

Koala

2593 MacVision 2.0 219.

★Kraft Systems ... 60 day MBG

2600 3-Button QuickStick 39.

4082 3-Button QuickStick ADB 51.

Kurta

2604 IS ADB 8½" x 11" Tablet 255.

5161 IS ADB 12" x 12" Tablet 385.

5162 IS ADB 12" x 17" Tablet 625.

2605 Cordless 4 Button Cursor 65.



Datadesk ... 30 day MBG

MAC-101 Keyboard—Includes macro program, Masterstrokes, to assign keystrokes and mouse clicks to 15 function keys. Beige, platinum, or ADB version \$145.

Foreign keyboards are also available call

3036 Grappler C/Mac/GS 2.0 79.

4076 Grappler LQ 1.5 103.

4487 Grappler LS 1.0 103.

★PCPC ... 30 day MBG

5005 SHADOWGRAPH Monitor

(gray scale, incl. CGC/2 Card) call

5004 CGC/2 Graphics Card call

★PTI/DataShield ... 30 day MBG

4845 MacDirector 109.

SoftStyle

3282 Printworks (Dot Matrix) 3.5 43.

3283 Printworks (HP laser) 3.6 85.

Summagraphics

4298 BitPad Plus ADB 325.

★Thunderware ... 30 day MBG

3648 ThunderScan 5.0 with PowerPort ... 189.

4994 LightningScan 409.

3645 Mac II Power Accessory 42.

MEMORY & DRIVES

★Cutting Edge ... 30 day MBG

3989 800k External Disk Drive 149.

5133 20 Meg Hard Drive 439.

3990 30 Meg Hard Drive 499.

3991 45 Meg Hard Drive 599.

5275 65 Meg Hard Drive 649.

5276 80 Meg Hard Drive 749.

★Dove Computer ... 60 day MBG

FastNet networking products call

1801 SCSI Interface/Port 109.

1807 MacSnap 524E 189.

1809 MacSnap 524S 249.

1811 MacSnap 548 449.

1812 MacSnap 548S 499.

1800 MacSnap 2SE 319.

1797 MacSnap Plus 2 319.

1804 MacSnap 2S 399.

1793 MaraThon 020 MSE1 585.

1794 MaraThon 020 MSE2 (1 Meg) 979.

1795 MaraThon 020 MSE3 (math chip) 779.

1796 MaraThon 020 MSE4 (1 Meg/chip) 1159.

5192 MaraThon 020 MSE5 (4 Meg) 1369.

5193 MaraThon 020 MSE6 (4 Meg/chip) 1559.

4663 MaraThon 030 Accelerator 32 Mhz 999.

Epson

5132 40 Meg Raw Drive (25ms) 436.

5204 70 Meg Raw Drive (25ms) 586.



Kurta

ADB Graphics Tablet—Enables user to move screen cursor to draw, sketch, and trace more accurately than with a mouse. Please see our line listing for sizes and prices.

Cordless 4 Button Cursor \$65.

★Logitech ... 30 day MBG

5082 ScanMan Mac 349.

★LYNX Computer ... 30 day MBG

1211 LYNX Trackball 65.

1212 LYNX Trackball ADB 65.

★Microseeds Pub. ... 60 day MBG

4843 WristMac 1.0 149.

5018 WristMac Executive 1.0 199.

★Mobius Technologies ... 60 day MBG

4846 MultiScreen 315.

★Mouse Systems ... 30 day MBG

2808 A+ Mouse 65.

2809 A+ Mouse ADB 85.

★Nutmeg Systems ... 30 day MBG

2994 15" Monitor for Mac SE 999.

4096 19" Monitor for Mac SE 1349.

4097 19" Monitor for Mac II 1449.

4849 LCD Interface (Kodak DataShow) ... 399.

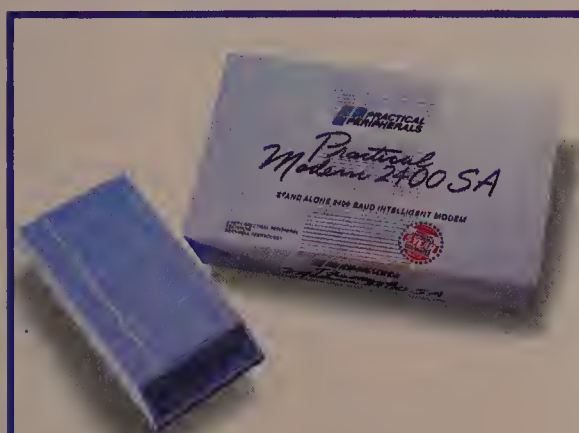
Olduvai Software

5138 Read-It! OCR Personal 2.0 99.

3034 Read-It! OCR 2.1 249.

★Orange Micro ... 30 day MBG

4488 Grappler Spooler 39.



Practical Peripherals ... 30 day MBG

Mac Communications Pack—Includes external 2400SA Modem, cable, and top-selling communication software. Hayes compatible, auto-answer. A superior value \$225.

our overnight delivery.

★LaCie, Ltd. ... 30 day MBG

- 4983 Maxcie Internal Drive Kit \$59.
4982 Maxcie External Drive Kit 189.

★PCPC ... 30 day MBG

- 3177 HD-WSI (Apple HD-20 to SCSI) . . . 269.
3189 MacBottom HD 45 SCSI call
4658 MacBottom HD 84 SCSI call

DISKS

★Verbatim ... 30 day MBG

- 3772 3 1/2" DS/DD Disks 16.
3297 Sony 3 1/2" DS/DD Disks 16.
2214 Fuji 3 1/2" DS/DD Disks 17.
2792 MAXELL 3 1/2" DS/DD Disks 17.

★Verbatim ... 30 day MBG

- 3773 3 1/2" HD Disks (1.44 Meg) 39.
3298 Sony 3 1/2" HD Disks (1.44 Meg) . . . 39.
2215 Fuji 3 1/2" HD Disks (1.44 Meg) . . . 39.
2793 MAXELL 3 1/2" HD Disks (1.44 Meg) 39.

ACCESSORIES

★Avery ... 60 day MBG

- 4864 3 1/2" Disk Labels (Qty. 250) 13.
4865 3 1/2" x 1 5/16" Address Labels (Qty. 3750) 15.
4811 8 1/2" x 11" Transparencies (Qty. 50) 22.
4807 1" x 2 5/8" Laser Labels (Qty. 3000) . 24.

★Computer Coverup ... 60 day MBG

- 1723 ImageWriter II Cover 8.
1722 ImageWriter LQ Cover 8.
1725 Mac SE Ext. Keyboard Cover Set . . 10.
4657 LaserWriter II Cover 10.

★Ergotron ... 60 day MBG

- 2004 Mouse Cleaner 360° 15.
3992 The Muzzle (covers power outlet) . . 62.
2000 MacTilt SE 68.

★Goldstein & Blair ... 30 day MBG

- 2267 The Macintosh Bible (2nd Edition) . . 20.

★I/O Design ... 30 day MBG

- 2379 MacLuggage Imageware II 49.
2376 MacLuggage Macinware Plus 64.
2381 MacLuggage Macinware SE 75.

Kalmar Designs

- 2531 Teakwood Roll-top Case (holds 45 disks) 14.
2532 Teakwood Roll-top Case (holds 90 disks) 21.
2533 Teakwood Roll-top Case (holds 135 disks) 31.

★Kensington ... 30 day MBG

MacConnection carries the entire line of Kensington's accessories. Partial listing below.

- 2589 Universal Printer Stand \$15.
2545 Universal Copy Stand 22.
4971 Modem/FAX Protector 20 25.
4973 Power Tree 20 27.
4974 Power Tree 50 54.
2559 Apple Security Kit 34.
2556 Maccessories Anti-Glare Filter 33.
2568 Maccessories SuperBase 34.
2585 Printer Muffler 80 43.
4070 System Saver SE 52.
2566 System Saver Mac (platinum) 64.
2546 Maccessories A-B Box 64.
5064 Apple Color Monitor Polarizing Filter 65.
5065 Full Page Display Polarizing Filter . . 65.
5066 Two Page Display Polarizing Filter . 135.
4941 Mac II Monitor Stand 65.
4643 Mac II Stand and Cable Kit 65.
2561 MasterPiece Mac II 105.
5229 PowerBacker 330 269.



Targus ... 60 day MBG

Mac SE & Extended Keyboard Carry Case—Made of a special dust and water-resistant material that's as strong as Cordura but much smoother so it won't wear out your clothing. Closed-cell foam protects against jolts \$75.

- 4013 High Trek Mac Plus carry case 59.
4014 High Trek Mac SE & ext. kybd. case 69.
4861 SE Protection Pak (std. keyboard) . . 65.
4862 SE Protection Pak (ext. keyboard) . . 75.

★Targus ... 60 day MBG

- 3618 ImageWriter II Carry Case 49.
3617 Mac Plus/SE Carry Case 59.
4015 Mac SE & Ext. Kybd. Carry Case . . 75.

OUR POLICY

- We accept VISA and MASTERCARD.
- No surcharge added for credit card orders.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order.
- No sales tax.
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped 1st Class Mail.
- International orders U.S. \$250 minimum.
- Upon receipt and approval, personal and company checks now clear the same day for immediate shipment of your order.
- Corporate P.O.s accepted subject to credit approval.
- COD max. \$1000. Cash or certified check.
- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. All items subject to availability. Prices subject to change without notice.
- To order, call us anytime Monday through Friday 9:00 to 9:00 EST, or Saturday 9:00 to 5:30 EST. You can call our business offices at 603/446-7711 Monday through Friday 9:00 to 5:30 EST.

SHIPPING

Continental US: Barring massive computer failures and other natural or unnatural catastrophes, all credit card orders phoned into MacConnection weekdays by 8 PM EST will ship Airborne the same night for delivery the next business day (i.e. not Saturday or Sunday), except for those within UPS Ground Zone 1 (which is also an overnight service). The total freight charge on any order placed with MacConnection is now \$3. Backorders will also ship Airborne overnight at no additional charge. Some areas require an additional day delivery.

Hawaii, Alaska and Outside Continental US: Call 603/446-7711 for information.



Farallon Computing ... 30 day MBG

MacRecorder 2.0—Record and play compressed sound in HyperCard. Newest version has improved editing tools, and includes XCMDs and XFCNs for volume and record adjustments. Plays in stereo on a Mac II or SE/30 . . . \$165.

★MacConnection ... 60 day MBG

- 4623 Solid Oak Disk Case, made by New England craftsmen (holds 90 disks) . . 29.

★Mobius Technologies ... 60 day MBG

- 4470 Fanny Mac QT 60.

★Moustrak ... 60 day MBG

- 2694 Moustrak Pad (standard 7" x 9") . . . 8.
2692 Moustrak Pad (large 9" x 11") 9.
2693 Moustrak Pad L/F (9" x 11") 10.
Moustrak Designer Series ea. 12.

Ribbons

- 3255 ImageWriter II Ribbon 4.
3261 ImageWriter II 4-color Ribbon 9.
3270 ImageWriter II Rainbow Six Pack . . . 20.
3260 ImageWriter LQ Black Ribbon 17.

★Simon & Schuster ... 60 day MBG

- 4230 The Fully Powered Mac book 24.

★Sopris Softworks ... 60 day MBG

- 4016 MacPlus Cover (navy) 15.
4171 Mac SE Std. Keyboard Cover (navy) . . 15.
4019 Mac SE & Ext. Keyboard Cover (navy) . 15.
4017 ImageWriter II Cover (navy) 11.
4168 ImageWriter LQ Cover (navy) 13.
4018 LaserWriter II Cover (navy) 17.
4012 High Trek ImageWriter II carry case. 49.



Cutting Edge ... 30 day MBG

800k External Disk Drive—Features the latest in technology. Compatible with 512E, Plus, and SE. Includes LED disk access light. Formats disks as 400k or 800k HFS. \$149.



“Next time I’ll fly MacConnection.”

Dear MacConnection,

I have been dealing with your company almost since your first ads appeared. I knew you were good, but I think you’ve overdone it now.

About two weeks ago, on a Monday night, I called you from New Jersey to

request that you send *Filemaker II* to my destination in California. Upon my arrival there the next day, I was surprised to find my package waiting for me, and it was in better shape than I was. Next time I’ll send my luggage by United, and I’ll fly MacConnection.

Raymond C. Andrews, M.D.
Imola, Italy

MacConnectionTM 1-800/622-5472

MacConnection, 14 Mill Street, Marlow, NH 03456 1-800/622-5472 603/446-7711 FAX 603/446-7791

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Just for the record, all the ads in this series feature photographs of real live MacConnection customers and the real live letters they wrote us. Really!

HERE COMES



MAX SEABAUGH

SYSTEM 7.0

*What to expect
from the forthcoming system
software release*



BY LON POOLE

Shelve your crystal ball, dump your tea leaves, and fire your astrologer. You no longer need to divine where Apple is heading with the next version of Macintosh system software, System 7.0. Even though System 7.0 won't be available until some time next year, we thought you might want a preview. Coincident with the Apple Worldwide Developers' Conference held in May, Apple marketing people introduced the major new technologies that Apple engineers have promised for System 7.0. Those technologies will incorporate

- outline fonts for the display screen and any printing device
- typographic text-layout facilities

- virtual memory and 32-bit addressing
- an enhanced Finder
- interapplication communication
- a new print architecture
- remote database access

In addition, System 7.0 will include tear-off menus, MultiFinder refinements, 32-bit QuickDraw (which has already shipped), and a Communications Toolbox (due to ship later this year). Other projects likely to be part of System 7.0 include sound-system improvements, file system enhancements, refinements to the system software that let it adapt more easily to international markets, and a one-button installer.

You'll be able to use System 7.0 on a Mac Plus, SE, SE/30, II, IIx, or IIfx.

On all those machines it requires at least 2 megabytes of RAM. Apple plans to move the entire Macintosh product line to System 7.0 and recommends that all users upgrade to 7.0.

Because System 7.0 is a work in progress, the descriptions Apple has provided of it are necessarily incomplete and subject to change. Apple has committed to the major features described here, but it may add more features or change how some of the ones described here work. You should expect changes in menu wording, icon design, and other implementation details. The complete feature set of System 7.0 will be announced later this year, as will availability. When System



7.0 does ship, you will be able to get it from user groups, online information services, and some dealers for roughly the cost of copying it. You will also be able to buy a system update package with manuals from a dealer; current cost of the update package is \$49. The real cost of upgrading to System 7.0 will be upgrading your Mac to 2MB, if you haven't already done so. Learning what the system software upgrade will include should help you decide whether you want to spring for the additional RAM.

OUTLINE FONTS AND LINE LAYOUT

Outline font technology delivers smoothly scaled fonts at any size. That's why a LaserWriter IINT's PostScript fonts look sharp at any point size. But Macintosh screen fonts have always been bitmapped fonts. They look great at the specific sizes installed in the System, but lumpy when scaled to other sizes (see "Lumpy and Smooth"). Furthermore, printing devices that use screen fonts—like the ImageWriter, Fax modem, and LaserWriter IISC—require double, triple, and quadruple sizes

programs. However, applications that only offer a limited choice of font sizes won't benefit as much as those that offer a way to directly specify a point size (including fractional point size). Your existing bitmapped fonts will also work with System 7.0, although you won't be able to convert them to outline fonts.

A standard set of outline fonts will come with System 7.0. More fonts will be available from many vendors, including Agfa Compugraphic, Bigelow & Holmes, Bitstream, Casady & Greene, The Font Bureau, ITC, Kingsley/ATF Type Corporation, Monotype Typography-USA, and URW. In addition, printing devices from GCC Technologies, Hewlett-Packard, Mirus Corporation, and Tektronix will work with the new outline fonts.

In addition to outline fonts, System 7.0 also will include line-layout features. Any application will be able to use the line-layout features to incorporate typographic text positioning such as kerning, justification, and ligatures. Line layout will also make it easier for applications to display and print languages that don't use the Latin alphabet, like Japanese and Arabic. Existing applications must be revised to take advantage of the line-layout features.

FINDER 7.0, MENUS, AND MULTIFINDER

Aside from fonts, the Finder is the most visible piece of Macintosh system software. It's being extensively revised for System 7.0. Highlights include the integration of Font/DA Mover functions, built-in file search, multiple icons for a single file, document templates, custom disk and folder window views, and a configurable Apple menu. For details on these and other capabilities, see "Finder 7.0 Close-Up."

Finder 7.0 and all other applications running with System 7.0 will offer tear-off



Lumpy and Smooth

The text above is lumpy because it was scaled from a bitmapped font. The smooth text below was scaled from a System 7.0 outline font.

menus, like the Tools palette in HyperCard. Hierarchical submenus will also be tear-off. The menu will disappear when you switch to another application using MultiFinder and reappear when you switch back. Detached menus will disappear completely when you quit an application unless the application has been revised to restore the menus' position the next time the application is opened.

System 7.0 will still use MultiFinder for multiprogramming. (It will let you open multiple applications concurrently and run one or more of them in the background.) MultiFinder 7.0 will work in basically the same way as today's MultiFinder, but it will be enhanced somewhat. It will list open applications at the top of the Apple menu instead of at the bottom. In addition, it will automatically start multiple background applications that you have put in the new Background Folder, which will be in the System Folder. With MultiFinder 7.0, desk accessories will appear in separate layers, like applications, not in one common layer.

The big news is that you will be able to temporarily hide, or *set aside*, all the windows of any or all open applications. (You won't, of course, be able to set aside the foreground—currently active—application.) Hiding windows reduces unsightly window buildup and provides smoother operation. Rough operation results when

The big news

is that you will be able to

temporarily hide,

or set aside, all the

windows of any

or all open applications

for best results. Those large bitmapped fonts take up lots of disk space.

System 7.0 will eliminate all bitmapped font problems by using Apple's own outline font technology for any display screen or printing device (see "Inside Outline Fonts"). Even PostScript printers will be able to print Apple outline fonts (in addition to PostScript fonts), as described in more detail later. The Apple technology will work with most existing application

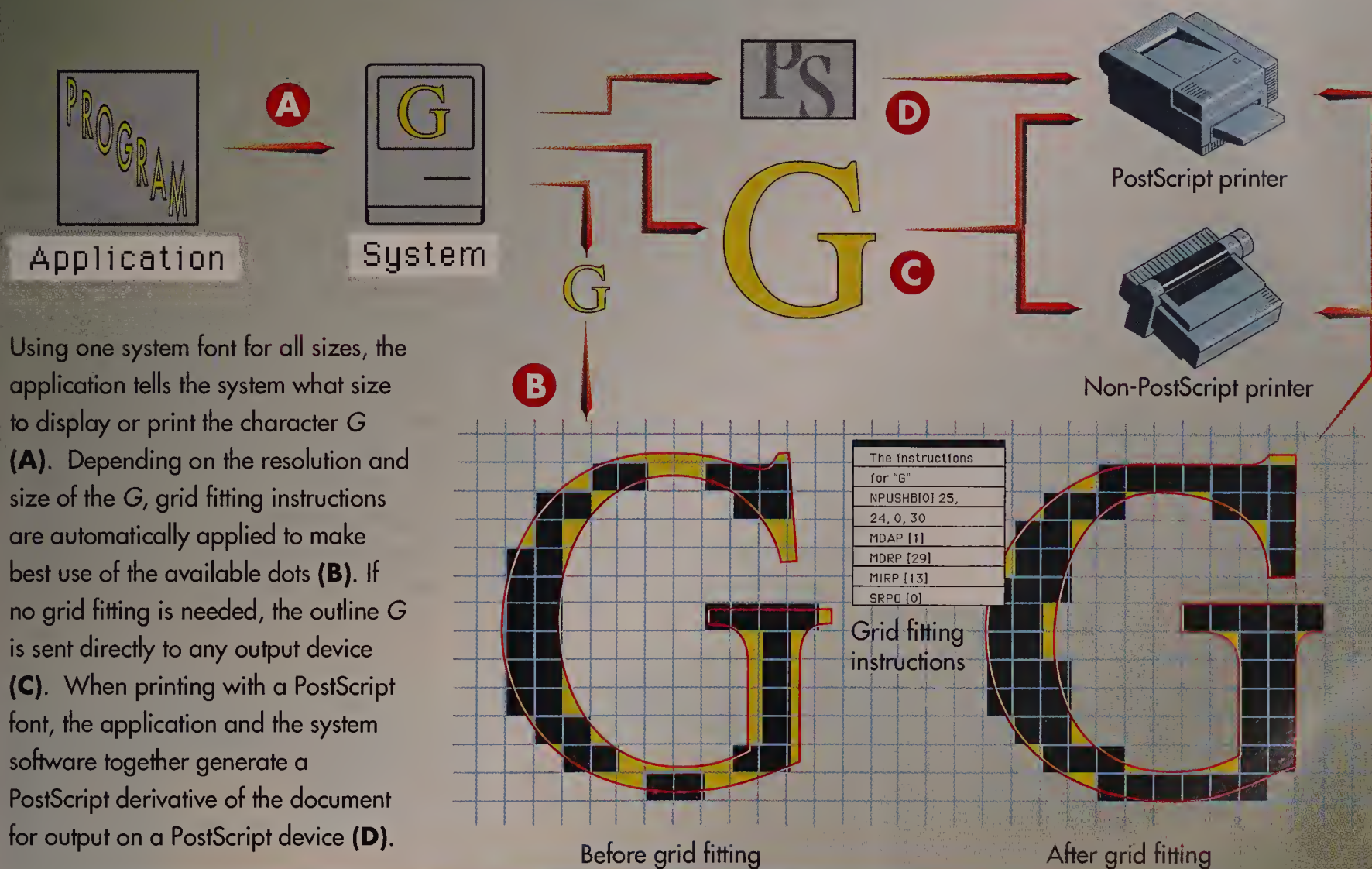
INSIDE OUTLINE FONTS

Outline fonts will store individual characters as mathematical definitions of lines and curves, rather than as a pattern of dots (a bitmap). When you ask for a character in any size, the Macintosh will enlarge the outline to that size and fill it with dots.

At small sizes, however, simply scaling the

font outlines will result in text with problems, such as an unwanted dot on the edge of a curve. These imperfections happen because the outline doesn't precisely fit the grid of small point sizes, especially if the dots are relatively large (as they are on the Mac's screen). The font designer will provide a set of instructions, also known as *hints*, that will tell

the Macintosh how to modify character outlines so they fit the grid. This process is called *grid fitting*. Apple is openly publishing the font format and the instructions that can be used for grid fitting. The diagram below illustrates how System 7.0 will use its outline fonts to display and print text in any size on any type of output device.



B A 10-point G requires grid fitting on a 72-dpi device...



A 72 pt. G at 72 dpi



A 72 pt. G at 144 dpi

...but at 144 dpi the same character undergoes grid fitting at 5 points.



A 72 pt. G at 300 dpi

Likewise, on a 300-dpi laser printer, the character is grid-fit at 2.5 points.



A 72 pt. G at 2540 dpi

On a 2540-dpi Linotronic, grid fitting is virtually unneeded since it would only be used to modify characters smaller than a single point.

G





the foreground application must pause while applications whose windows are not hidden update the contents of those windows. The pause may be especially onerous when you are using virtual memory (described in more detail later), because the system may have to bring applications into physical memory from disk in order to update their windows.

INTERAPPLICATION COMMUNICATION

The Mac has always had static information interchange between applications via the Clipboard. For example, you can paste a graphic created in a drawing application into a word processing document. But if you later change the graphic, you must again copy and paste it to the word pro-

cessing document. System 7.0 will implement methods for a dynamic information interchange, called *live copy/paste*, that will eliminate repetitive copying and pasting. The process will essentially let you paste a live copy of information from one document into another document of any type. If you change the source document, you can update the live copy with-

FINDER 7.0 CLOSE-UP

Finder 7.0 will extend its predecessors' basic, direct-manipulation interface—click and drag—to some brand-new functions and to the functions of some formerly separate system utilities. Instead of having to use the Font/DA Mover utility to install fonts and desk accessories, you will simply drag their icons to the System file (A). Similarly, you will install applications, documents, folders, and so on, in the Apple menu by dragging their icons to a specially marked folder. Dragging a document to a printer icon, which you will place on the desktop using the Chooser, will cause the printer to print that document (B).

In System 7.0, for the first time in the history of Macintosh, the Finder will live up to its name. You will be able to search for any information that appears in any text view, or for ranges such as everything modified between two dates. Finder 7.0 will locate the first item matching your criteria, open the folder that contains the found item, highlight the item, and scroll the folder window to show the item. An option will let you continue to search for items that meet the criteria you have set up.

To organize your disks so you can find items on them more easily, you will be able to create *aliases* for icons. An alias is an icon that represents another icon and behaves just like the icon it represents (C). You can put aliases in any folder on any disk or network file server. For example, you could organize original icons by subject, and arrange aliases to them by date in other folders.

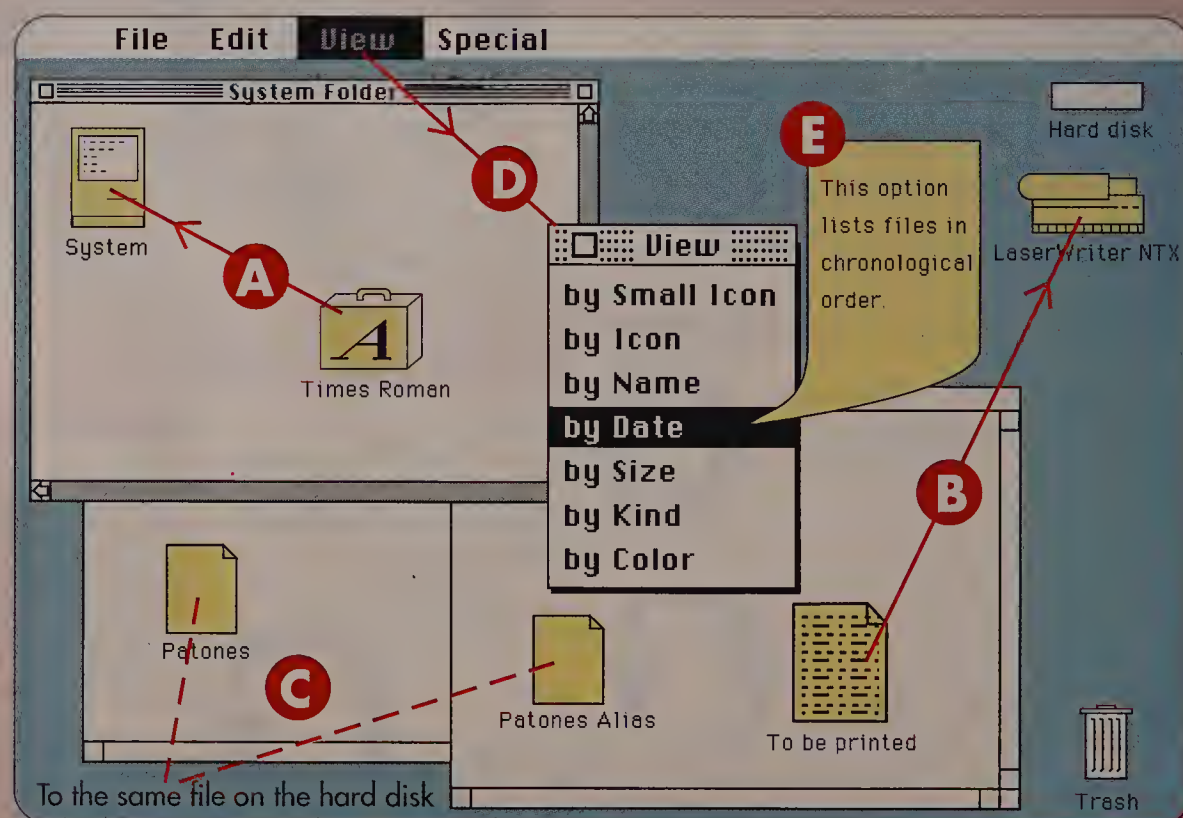
In Finder 7.0, double-clicking on any icon will do something worthwhile. As always, double-clicking on applications, documents, folders, and the Trash Can will open them. Additionally, double-

clicking on the appropriate icon will open a DA, show a font sample, play a sound, open a control panel device, or show a printer's status. The System file will open like a folder, when you double-click on it, to show items installed in it.

Views of open disks and folders will be customizable in Finder 7.0. You will be able to adjust the position of icon names in an icon view and determine the content and arrangement of information that appears in a text view. Text views will have horizontal scroll bars so you can see all the information without zooming the window. If you do zoom a window, Finder 7.0 will enlarge it only enough to show its contents. When you are selecting icons in a window, dragging past the edge of the window will automatically

scroll the window. You will also be able to select items in a window by typing, as you can today in a standard Open dialog box.

Finder 7.0 will have other assorted new attributes. One of them will let you make a template, called stationery, from any document. When you open stationery, Finder 7.0 will make a copy of it and open the copy. You will also be able to tear off any menu (D). Another feature will provide help on any icon or menu item (E). Additionally, Finder 7.0 will empty the Trash Can only on your command or at a time you set. In the future, you will be able to extend Finder 7.0 with other integrated functions such as electronic mail and backup. The final version of the Finder will differ from the representation below.



out going through another copy/paste operation (see "How Live Copy/Paste Works").

Live copy/paste and the Clipboard are parts of a larger framework for information interchange in System 7.0. Apple's framework, called *interapplication communication* (IAC), goes beyond the basic application-to-application communication, called *interprocess communication* (IPC), that other computer systems provide. IPC lets an application send messages to other applications that are running at the same time on the same computer. A part of Apple's IAC called *program-to-program communication* (PPC) adds network messaging and delayed messaging to IPC. This means that PPC will store messages sent to an application not currently running, and will forward the messages when the application is next started. PPC will also dispatch messages across a network to applications running on other Macs.

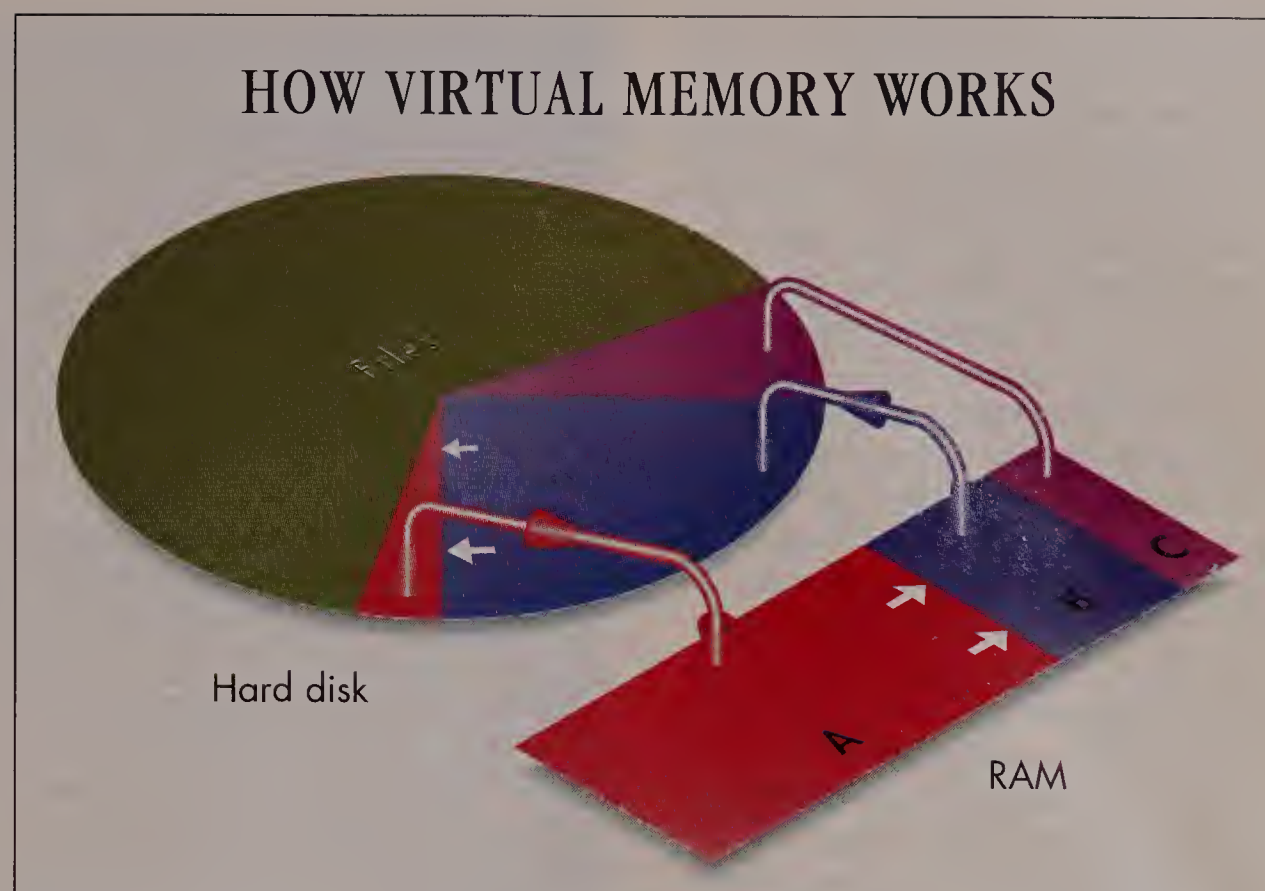
Additionally, Apple's IAC will include a standard set of messages called *AppleEvents*. Using AppleEvents such as Open Document, Print, and Move Window, one application can control some actions of other applications. For example, a telecommunications application working in the background under MultiFinder could use AppleEvents to send data from a remote computer to a database or charting application running in the foreground. AppleEvents also makes user scripting possible, although that is not provided with System 7.0.

Apple's IAC is not the first such technology for the Macintosh. For example, UserLand IPC lets programmers add inter-application messaging to programs now. It has no user-level component like live copy/paste, but it requires less memory than System 7.0.

Unlike most of the other System 7.0 features described so far, live copy/paste won't work in existing applications. These applications will have to be revised to take advantage of any IAC features.

NEW PRINT ARCHITECTURE

System 7.0 will offer a new print architecture designed to further standardize and simplify the process of printing. A new,



With virtual memory, you can open more applications than will fit in RAM at once. The System keeps the most frequently used parts of the open applications in RAM and the least frequently used parts in a reserved area of the hard disk. As you use different features of the open applications, the System swaps parts of the applications between RAM and the hard disk. This diagram shows Application A and Application B open concurrently, along with the system software. The user has just activated Application A, so the System is bringing more of that program into RAM from the hard disk while putting parts of Application B onto the hard disk to vacate RAM.

modular Print dialog will keep printing simple on the surface yet offer full control over printing options in control panels that appear at the click of a button (see "New Print"). In addition, the new print architecture will provide background printing for any printer, improved color printing, and automatic conversion of color to halftone (gray scale) as needed. You will be able to define custom page sizes and mix different page sizes and orientations in a single document. For example, page 1 might be an 8½-by-11-inch letter, page 2 a landscape-oriented spreadsheet, and page 3 an envelope.

PostScript printers will still offer some advantages over other printers, notwithstanding Apple's outline font technology. For instance, PostScript printers can be shared on an AppleTalk network. In addition, they process page images themselves, instead of loading the already burdened Mac CPU. PostScript printers will be supported as they are today. System 7.0 will always display Apple-format outline fonts on the screen, and the PostScript device will continue to use Post-

Script fonts that match the Macintosh fonts. If there are no matching PostScript fonts, the Apple-format outline fonts will be used at the printer's resolution. Apple is working on methods for correlating its font technology and the PostScript font technology. In addition, Adobe has announced plans to offer a utility that translates Apple outline fonts to PostScript outline fonts.

To use the new print architecture, you will need to replace the printing resource, often called a *driver*, in the System Folder for each printer you use. Apple will supply replacement drivers for all its printers with System 7.0. Drivers for other printers must be revised by their manufacturers. You will be able to use the new LaserWriter driver on the same network with other Macintoshes that use today's LaserWriter 6.0 driver.

VIRTUAL MEMORY AND 32-BIT ADDRESSING

For years, mainframe computers and minicomputers have transparently treated

part of a hard disk as additional memory. System 7.0 will bring this technique, known as *virtual memory*, to the Macintosh. Virtual memory will let you run more applications with MultiFinder and work with larger amounts of information than does physical memory alone. You need buy only as much RAM as you need for average use, not for peak use.

To use virtual memory, the Macintosh will need memory-management hardware—either a 68030 CPU or a 68020 CPU in conjunction with a 68851 PMMU. A Mac Plus or Mac SE, both of which have the 68000 CPU, will not be able to use virtual memory. In addition, the Mac will need a hard disk with at least as much free space as you want to use for virtual memory. Most applications will work with virtual memory without being redesigned.

Virtual memory works by keeping the most active application and document segments in physical memory. Less-used segments of open applications and documents are kept in a special file on the hard

System 7.0 will
offer an impressive
list of new
technologies, but it
won't answer
everyone's prayers

disk. When an application needs a segment not currently in physical memory, the system software automatically swaps the least-used segment in physical memory with the needed segment on disk. Under MultiFinder, this swap will generally occur when you switch applications.

System 7.0 will allow the Mac II family and the Mac SE/30 to use 32-bit memory addressing. This will extend their memory capacities beyond 8MB to 128MB of physical RAM and up to 1 gigabyte of virtual memory. Only applications that are designed to work with 32-bit addressing

HOW LIVE COPY/PASTE WORKS

System 7.0's live copy/paste feature will link documents dynamically and indirectly. *Copy/paste* is a bit of a misnomer, because the procedure doesn't involve the Copy and Paste commands. Instead you will use two new commands in the Edit menu, Publish and Subscribe, as follows.

Select whatever you want to copy and then choose the Publish command. A dialog box similar to the standard Save dialog box appears, and you use it to specify a name and folder in which to save the selection.

Then open the destination document (or switch to it using MultiFinder), select an insertion point, and choose the Subscribe command. A dialog box appears; this one looks and works like a standard Open dialog box. You use it to choose the publication you want placed.

The diagram depicts a publisher, a publication, and two documents containing subscribers. The area you selected in the source document is called a *publisher*, the information is saved to a disk file called a *publication*, and the section containing the copied information in the destination document is called a *subscriber*. A publisher has only one publication, but a publication can have any number of subscribers.

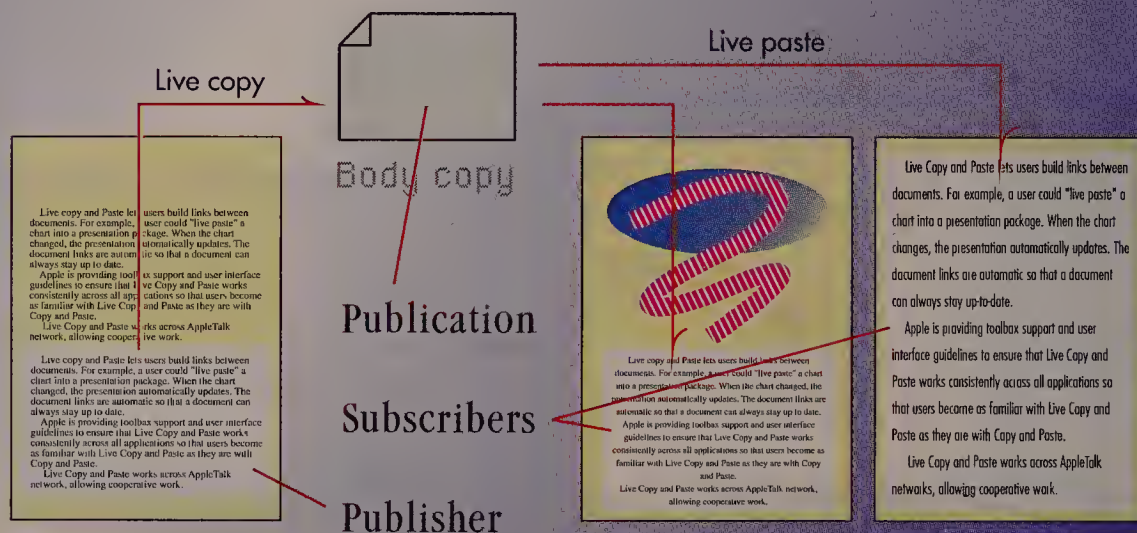
Publishers and subscribers are sections of documents, but publications are disk files and appear in the Finder as named icons. You can manipulate publication icons as you would document icons. For example, you can drag

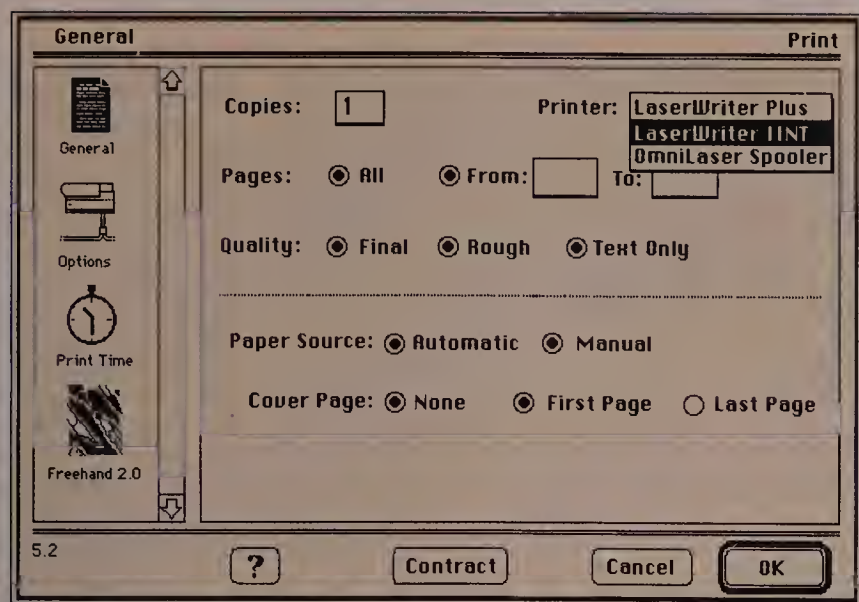
publications to a network file server, making them available to all network users. Double-clicking on a publication icon or otherwise opening a publication opens the document that contains its publisher and scrolls to the publisher. You do not revise a publication directly; you revise its publisher.

When you revise a publisher, System 7.0 notifies applications so they can update subscribers. As a rule, you do not edit subscribers directly. However, subscribers can be resized, repositioned, and perhaps rotated. These simple alterations are called *adornments*.

System 7.0 updates subscribers in discrete editions, not continuously. Changes you make in a publisher do not appear live in an open subscriber. The publishing application saves a new edition of the publication when you save the document that contains the publisher. Subscribers in open documents are notified immediately. Subscribers in closed documents are notified when they are next opened. You choose whether individual subscribers are updated with new editions automatically or only upon your request.

A publisher can itself contain one or more subscribers. In other words, you can chain publications. A publisher can even subscribe to its own publication, or to another publication that subscribes to it. This circular chaining, or *recursion*, is limited by the amount of memory available.





New Print

The new Print dialog will be modular. Shown here is a prototype of the general panel, in which you will choose a printer from a pop-up menu and set other options that might apply to any print job. Clicking an icon at the left will bring up another panel, in which you might set options particular to a specific printer or application. The final version of the print dialog will differ from the prototype above.

(Apple calls these applications *32-bit clean*) will be able to use the additional memory capacity. Without 32-bit addressing, virtual memory will be limited to 14MB.

OTHER ENHANCEMENTS

There will be even more new features in System 7.0 than 32-bit addressing, virtual memory, the new print architecture, inter-application communication, MultiFinder enhancements, Finder 7.0, line layout, and outline fonts. Another new feature will be a simplified CL/1 database-accessing language. Any application will be able to use it to give you easy access to large databases such as Oracle, Sybase, Ingres, Informix, RDB, and Vax-RMS running on other computers. For example, you might use a single menu command named Get Data to place information from a remote corporate database into your document.

System 7.0 will also make it easier for developers to add sound to applications. You will be able to compress sound at a ratio of 3:1 or 6:1 to save disk space, and any Macintosh using System 7.0 will be able to expand the compressed audio in real time. Multiple audio channels and a multichannel mixer will enable applica-

tions to play combined sounds, such as a voice over music. System 7.0's MIDI-management tools will provide a standard method for integrating electronic musical instruments with the Mac. In addition, a real-time event sequencer will let you synchronize audio with graphics and animation.

System 7.0's improvements to the Mac's file-handling abilities will expedite working with disks. The new file system will assign every file a unique file ID number so an application can always find needed files even if you have moved them to a different folder. A speedup in the directory search method will enable Finder 7.0 and other applications to locate files quickly. For example, a typical time to search an entire 80MB hard disk is 3 seconds. Finder 7.0 will use another new file system tool, the *Desktop Manager*, to keep track of icons and comments on hard disks and other storage devices larger than 1.4MB. It will handle thousands of items without bogging down. The new file system will also provide a platform for directly accessing files from other filing systems, such as MS-DOS, OS/2, and ProDOS. With additional software, the Finder and other applications will be able to make foreign disks look and act like Macintosh disks.

MORE TO COME

System 7.0 will offer an impressive list of new technologies, but it won't answer everyone's prayers. System software constantly evolves. Another version will be along in a couple of years, and it won't have every feature either.

It's much too soon to definitively list System 7.0's omissions. But likely to be missing are QuickDraw extensions for handling text rotation, bezier-curve drawing, and other graphic effects. Outline fonts and line layout will take the Mac display only part of the way to matching PostScript. Likewise, AppleEvents' mes-

sages will supply a basis for user scripting, but the scripting language will still be missing. For example, a user script could periodically send messages to start a telecommunications application, get new stock prices from a remote database, paste the prices into a spreadsheet, and save the spreadsheet. Additionally, MultiFinder's new ability to set aside all of an application's windows will help you manage the window but will be no help in managing multiple windows in an application. If we can have system-wide tear-off menus, why not a system-wide window menu? And anyone who has ever used HyperCard knows documents can be too big for one 800K floppy disk. The Finder, though, still won't be able to compress and decompress files on disk or split a large file across multiple floppy disks.

Almost certain to be left for a later version are complete multiprocessing and multiprogramming capabilities. The new MultiFinder will provide basic capabilities, but it won't protect one application against damage by another. Furthermore, you won't be able to prioritize applications, nor will an inactive application be able to preempt the foreground application to take care of urgent business. Additionally, System 7.0 will not offer standard methods for developers to integrate coprocessors for graphics, signal processing, direct memory access, and so on.

Please remember, what you read here describes System 7.0's major new features. The exact feature set and details of the user interface won't be disclosed until later this year. Taking full advantage of all the new features will require lots of work on the part of third-party developers. Before that can happen, Apple must work hard to make System 7.0 real. What can you do in the meantime? Start saving money to buy more memory. ■

See *Where to Buy* for contact information.

.....
Lon Poole, alias Patones, is a Macworld contributing editor and author of *Mac Insights* (Microsoft Press, 1987) and *HyperTalk* (Microsoft Press, 1988). He has been informing users about Mac system software since 1984, alias the old days.

Macintosh Masterpieces

*The state
of Mac art:
winners
of the second
annual
Macintosh
Masters
art contest*

One of the best things about running an art contest is that it gives us a chance to see what people in the graphics community are really doing with their Macs. In comparing this year's entries to last year's, it's clear that Mac users haven't lost their passionate enthusiasm for their machines, nor their ingenuity in inventing creative ways to put Mac technology to use. Some new trends are starting to emerge, however.

As expected, the '89 entries are much more technically accomplished. Hardware and software capabilities that people were only experimenting with last year have become commonplace. Color, for example, is everywhere—despite the continuing lack of affordable ways to produce quality output.

The types of work coming in have begun to change as well. Graphic Design remains the most populous category, but the dominance of printed media is declining. Just as the pundits predicted, the Mac is moving in the direction of electronic and multimedia work. Ten times more animation came in this year than last, one piece even arriving on CD ROM. There were sound pieces; a complete multimedia presentation involving animation, video, slides, and music; and despite our separate SuperStacks HyperCard contest, HyperCard entries of all kinds.

But by far the most dramatic difference between this year's and last year's contest was the sheer number of entries: thousands compared to hundreds. Judging this mountain of Mac art and assigning awards in eight categories required a panel with a mix of aesthetic and technical expertise—as well as stamina. Julie

Lazar is the curator of media and performing arts at the Museum of Contemporary Art in Los Angeles,

by Joe Matazzoni

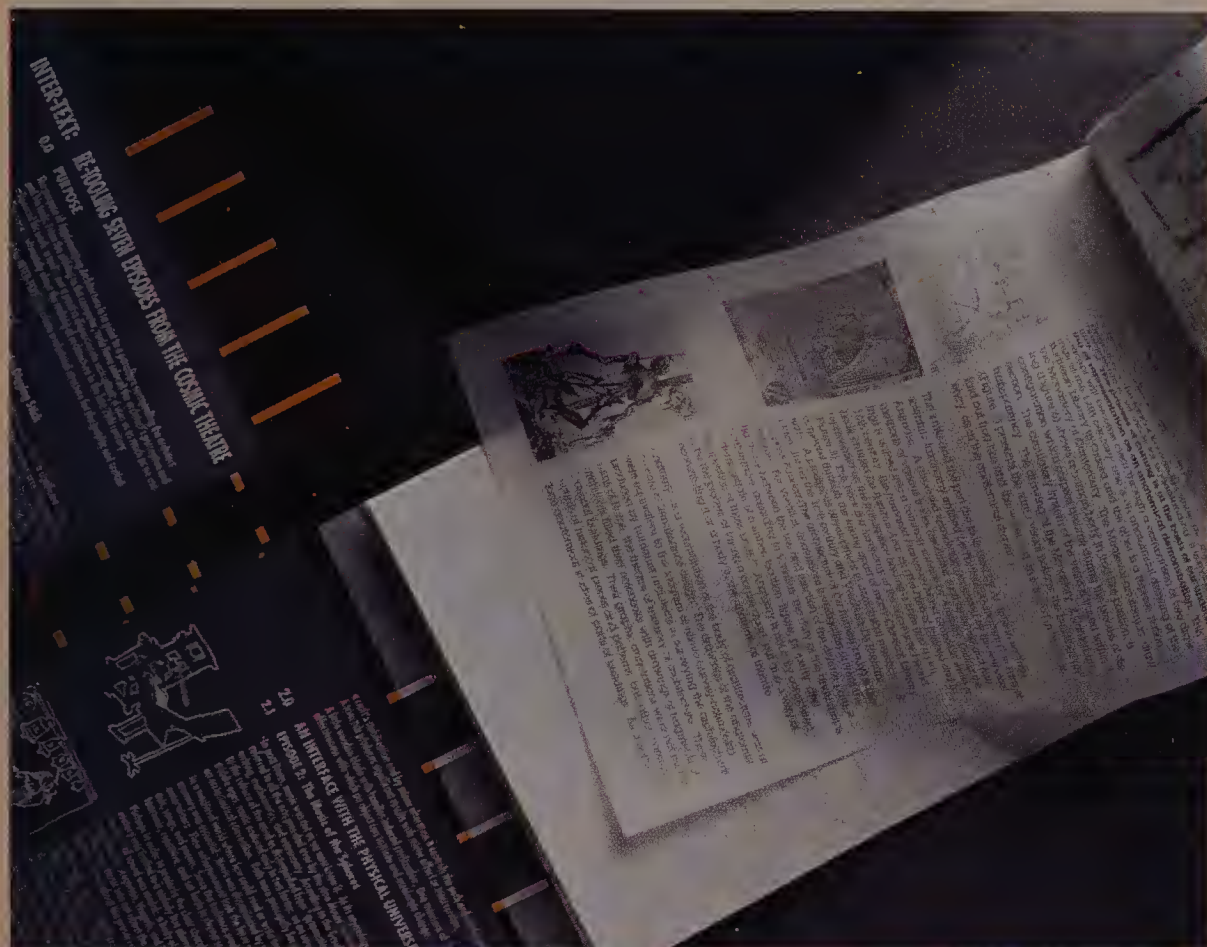
where she exhibits and commissions works in interdisciplinary and new art forms. Rob Riley presides over a similar corner of the art world at the San Francisco Museum of Modern Art, serving there as curator of media. Design consultant Christopher Burg, a former art director of *Macworld*, lent the panel his graphic-design and Macintosh expertise. Carl Rosendahl is the president of Pacific Data Images, a top producer of computer animation for

television and film. And Lynn Hershtman, credited with creating the first video art disk, contributed a computer artist's perspective. Hershtman also directs the Inter-Arts Center at San Francisco State University.

One final observation about this year's contest entries is worth making: although people are clearly much more comfortable now with com-

puter graphics technology, the Mac isn't yet at the point where it's taken for granted as just another medium. Perhaps the most telling evidence of this is the large percentage of entries that take the computer explicitly as their subject. Look at the winners on the following pages: an illustrated adventure takes a small boy inside the computer, ceramic tiles incorporating Mac screens celebrate great moments in electronics, books explore the effects of technology on architecture and publishing, an animation called *Computer Graphics* tells a modern parable of the creative process, a piece of techno-folklore depicts a Mac gremlin haunting halls of silicon, and so on. Doubtless some of these works simply embody the self-reflection so ubiquitous in the arts today. But more commonly I think they evince a genuine fascination with the computer, or at least a sense that Mac art is still something apart. Perhaps because the computer continues to leave its traces in what it produces, computer art appears technological and therefore especially apt for talking about technology.

When this perception changes and the computer becomes just another art-room fixture, the concept of a Macintosh art competition may start to sound arbitrary. Until then, however, *Macworld* will continue to encourage and celebrate the best in Mac art through the Macintosh Masters contest. On behalf of *Macworld*, I'd like to thank the sponsors and all of the artists who submitted their work this year for making the contest possible, and to invite everyone to participate next year in Macintosh Masters III.



A

GRAPHIC DESIGN

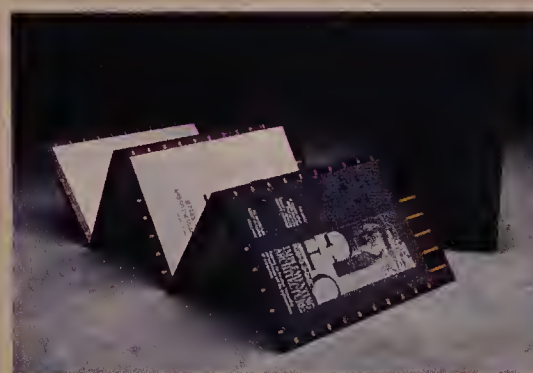


First Place and Grand-Prize Winner (A) *Implementing Architecture* Designer Pattie Belle Hastings created this hand-bound, limited-edition art book for the Architecture Society of Atlanta and Nexus Press. Five scholarly essays on architecture and technology open vertically from the panels of the accordion-fold game board. An "Inter-Text" on the history of technology covers the board panels and knits the collection together. Throughout the essays, Hastings achieves a textural quality by interspersing pages of semitransparent vellum with patterned pages.

Hastings (shown below, left, with a different project) laid out *Implementing Architecture* in PageMaker, having scanned



DREW STALUS (3)



in much of the line art (the background textures were created traditionally). "We were working with very limited funds, but managed to pull off this very complicated piece," she observes. "We couldn't have done

it without the Macintosh." Hastings also emphasizes that she couldn't have done it without the rest of the project team that included Rob Miller (editor), Michael Goodman (project director), JoAnne Paschall (press director), and Stan Sharshal (production).

The Tektronix Color Image Printer Hastings won as a grand prize will come in handy for her next book, which uses color imagery extensively. She selected the Adobe Collector's Edition, Volumes I and II, as her prize for placing first in Graphic Design.

B



FRED STIMSON

C



MARCH



AUGUST

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30
31				



NOVEMBER

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31					

GRAPHIC DESIGN (continued)

Second Place (B) *The Influence of Technology on Graphic Design* Charles Altschul wrote, designed, and produced this laser-printed book as his master's thesis in fine arts at Yale. He laid out the pages in QuarkXPress and used a variety of programs—including ImageStudio and Adobe Illustrator—to enhance the book's many scanned images.

Third Place (C) *Stone Letterform Calendar* Min Wang built up the rich textures and colors of this Adobe Illustrator 88 calendar through trial, error, and multiple applications of Kroy Kolor. The Kroy processor uses heat to transfer colored media from an acetate backing to the black portion of any laser printout. Wang discovered that he could cause the acetate to crinkle in the processor, adding an element of chance to his work and lending a physicality uncommon in digital pieces.

Honorable Mention (D) *The Adobe Playing Card Deck* Five designers used Illustrator 88 to produce this playful deck: Gail Blumberg and Joss Bratt Parsey designed the diamonds, Russell Brown illustrated hearts, Spades were created by Ruth Kedar, and Paul Woods did the clubs.

D



FRED STIMSON

E

Emigre Fonts are original designs, available in PostScript or use with Apple Macintosh computers.

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(415) 845-9021

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Copies of this stack are available for \$5 (includes shipping and handling.)

Matrix **Matrix**

Matrix responds well to algorithmic manipulations because its forms are harmonious with the digital grid on which these effects are based. Classical elements are adapted to a digitally economical format, ensuring legibility for text applications.



BUSINESS AND INFORMATIONAL GRAPHICS

GRAND PRIZE

First Place and Grand Prize (E) *Signs of Type* Informational Graphics is a category for art that tells a story. Zuzana Licko created a HyperCard fonts catalog to tell about her company, Emigre Graphics, and its designs. In addition to displaying Emigre fonts, *Signs of Type* uses animation to show such things as how well a font responds to stretching, or to emphasize a face's characteristic qualities. All fonts were designed in Fontographer; Licko used MacDraw and MacPaint to create the stack screens. Licko won a Truevision NuVista 32-bit color board as her grand prize, and selected a copy of Aldus FreeHand for

winning in the International Graphics category.

Second Place (F) *The Stat Store Publishing Promotion* Alexander Isley incorporated examples of The Stat Store's publishing services—electronic design and production, laser and Linotronic typesetting, image and OCR scanning—into the design of this mailer. Stat Store staff members E-Ping Nie Medalia and Serge Lazarev created the artwork. QuarkXPress 2.0 and Illustrator 88 were used to print separations directly to Linotronic film.

Third Place (not shown) *RGBVideolink Demo* Robert Haydock.

HOME ?

Matrix Book Matrix Regular Matrix Bold

Modula Sans Modula Bold Modula Black

Modula Serif Modula Serif Bold Modula Serif Black

Oblong Oblong Bold

Variex Light Variex Regular Variex Bold

MOORE CHOICES

the variex family is based on the most primitive of marks: the line. each character is defined by centerlines of uniform weight, from which the three weights are also derived.

d b c d
e f g h i

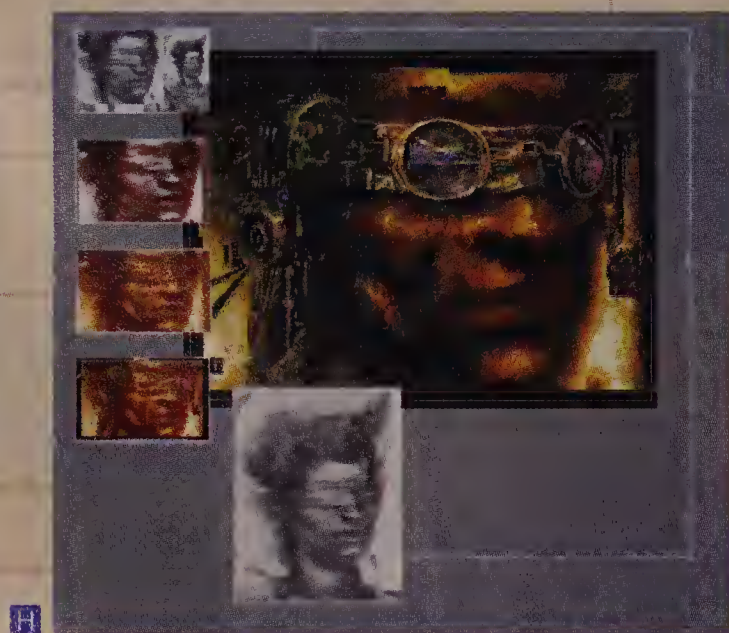


FINE ARTS

First Place (G) *Voltaic Pile, Transistor, Silicon Chip: Three Memorable Moments in the History of Electronics*
Ceramics artist Brad Yazzolino thinks of his works as “visual time capsules” and enjoys the irony of fixing screen images, ephemeral as they are, in the abiding medium of ceramic tile. Yazzolino used SuperPaint and MacPaint to design the patterns and screenshots in this 39-inch piece. He transferred the designs to tile by means of silk screen, hand painting, and airbrush. The central panel shows the ENIAC, the first all-electronic computer. At bottom are pictures of vacuum tubes and the cover of Robert Boyle’s 1675 classic book on electricity.

Future works by Yazzolino will feature graphics produced in Digital Darkroom, which he selected to be his prize.

Second Place (H) *Progression* Insets show the history of this digital painting, which was created for a book on creativity and the collaborative process. Darrel Anderson began by making a low-resolution, gray-scale scan of an oil painting by his partner, Richard Berry. Using paint software he wrote himself, Anderson next added color and reworked the piece according to his own creative promptings.

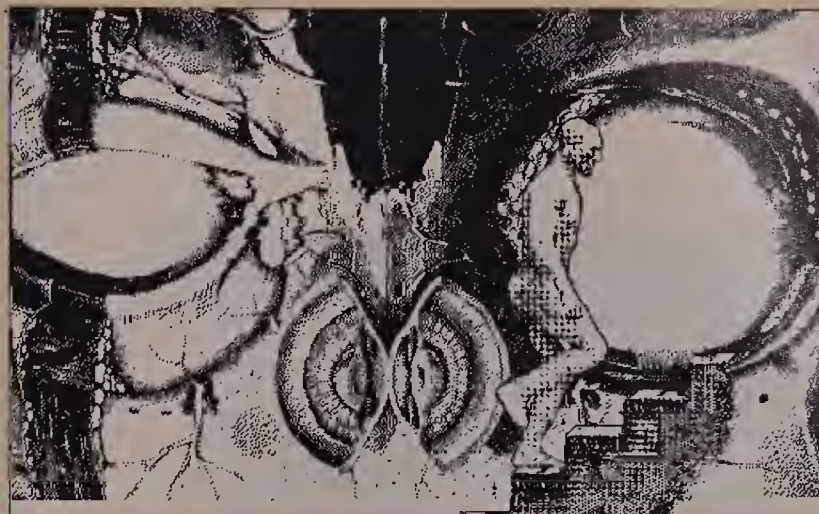




ANIMATION/VIDEO

First Place (I) *Computer Graphics* To achieve the whimsical, hand-drawn quality of the cartoons in this decidedly ambivalent parable on life with computers, Robert Haydock drew his basic outlines on paper and then scanned them. He added color in PixelPaint and animated the piece in VideoWorks II. Haydock selected Microsoft Excel for his software prize.

Second Place (J) *The Eye* Eric Mattson and Alain Mongeau videotaped this, their first VideoWorks animation, directly off the screen. They produced the 11 megabytes' worth of images and almost 3MB of sound using MacPaint, SuperPaint, scanned imagery, and SoundWave software.



3-D/IMAGE SYNTHESIS

First Place (K) *Platinum Toad* Darrel Anderson wrote his own modeling, rendering, and animation software to create this impressive 3-D motion study. The Toad's realistic movement is a result of the modeling software's integration of hierarchical motion with object reformation; together, these yield objects that not only move in relation to one another but also flex. The smooth, partially metallic look of the graphics results from



their having been rendered at a large size and then shrunk intelligently using a pixel-averaging algorithm. Anderson, who is working on a book (see Fine Arts category), selected PageMaker as his first-place prize.

WILD CARD

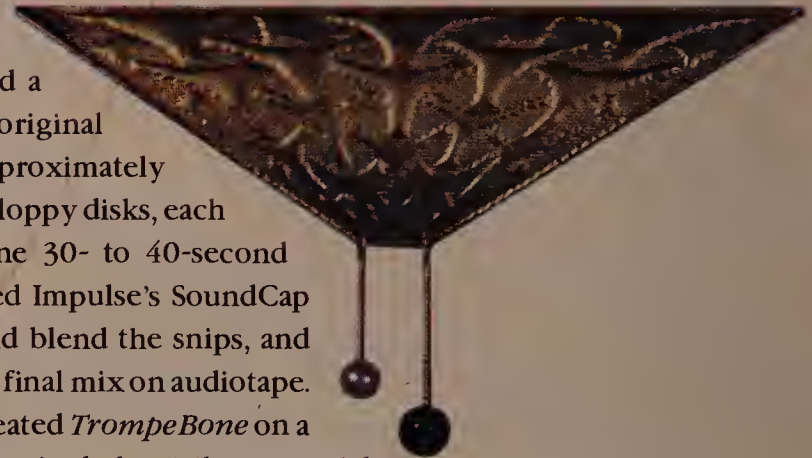


First Place and Grand Prize Winner
(L) *The TrompeBone of Chris Schiff*

A piece of radio art is this year's Wild Card winner. To create his 26-minute sound collage, Doug Kahn recorded some 15 hours of material, mostly the conversations of his friend, composer Chris Schiff. Kahn next used an Impulse Software audio digitizer to record a first cut of the original material onto approximately 80 double-sided floppy disks, each of which held one 30- to 40-second snippet. Kahn used Impulse's SoundCap editor to bend and blend the snips, and then rerecorded a final mix on audiotape.

Kahn, who created *TrompeBone* on a 512K system, is excited about the potential computers offer to "create an artistic form based on all of the possibilities of sound." The Mac II he earned as a grand-prize should certainly give him more possibilities to explore. As his prize for winning in Wild Card Kahn also selected a copy of Microsoft Word 4.0.

Second Place (M) *Datafall* Vernon Reed used an ImageWriter printer to forge this piece of Mac jewelry. After designing the brooch in SuperPaint, Reed passed a sheet of soft silver foil through the ImageWriter, where the print head hammered out the relief pattern. Reed next treated the silver to harden it, electroplated it with 24-karat gold, and bead-blasted it to obtain a satin finish. An onyx bead and a pearl complete the design.



MICHAEL LLEVELYN

L

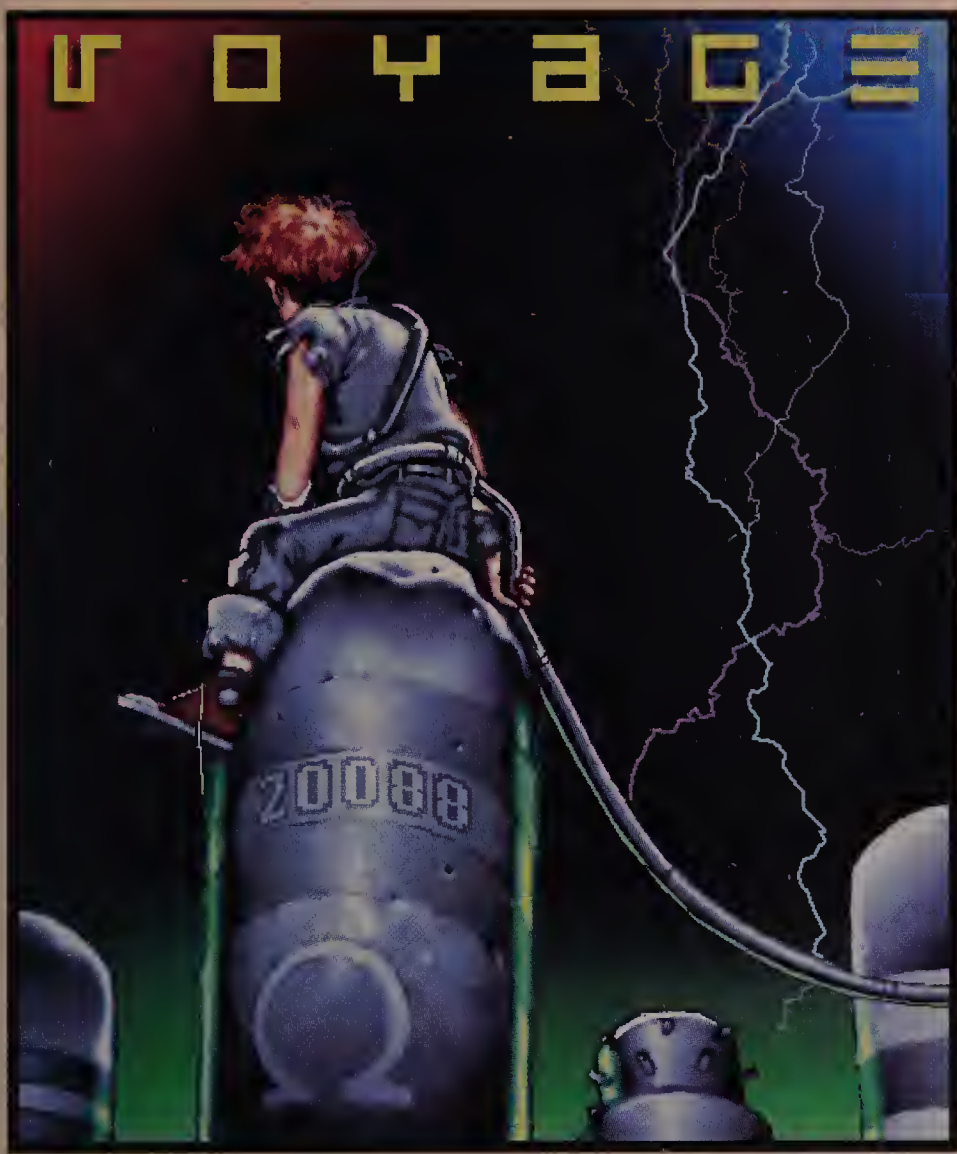
TECHNICAL ILLUSTRATION

First Place (N) *Santa Fe* Daryl Hutchinson scanned a photograph of this Santa Fe Super Chief diesel train into Illustrator 1.0, where he used it as a template to create this rendering. For coming in first in this category, Hutchinson won a selection of four Adobe fonts.

Second Place (not shown) *Dior Glasses* Lydia Kinata



N



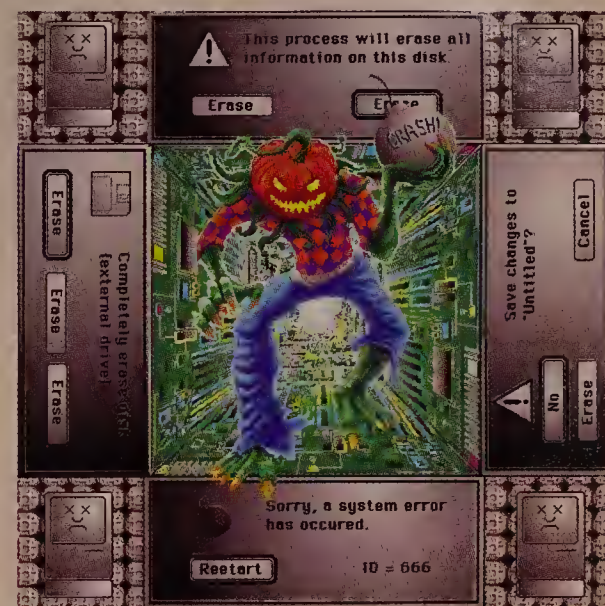
O

ILLUSTRATION

First Place (O) *Voyage* Pepe Moreno began this cover for a proposed book in ImageStudio, using the blending tools to paint his basic shading and shapes in grays. Moreno next used PixelPaint's Color Editor to substitute color for gray values, and then brought desired portions of green, red, and blue versions into Studio/8 for assembly and final editing. Moreno will receive Adobe's image-processing program, hitherto known as PhotoShop, as soon as it's released.

Second Place (P) *Connectivity* Scott Campbell used FreeHand 2.0 to produce this illustration for an article about cabling for networks.

Third Place (Q) *Pumpkin Head* "As soon as I started to work on this project, strange things began to happen," writes Brad Parker of his winning entry. Despite mysterious hardware deaths, unstable software, suspicious pet behavior, and ominous atmospheric phenomena, Parker managed to complete a PixelPaint rendering of this Mac prankster—and, one hopes, to exorcise it from his system.



Q



P

MACINTOSH MASTERS II WAS MADE POSSIBLE BY SUPPORT FROM THE FOLLOWING COMPANIES: ADOBE SYSTEMS, APPLE COMPUTER, ALDUS, LETRASET, MACROMIND, MICROSOFT, SILICON BEACH SOFTWARE, SUPERMAC TECHNOLOGY, TEKTRONIX, AND TRUEVISION.



DRAW,

EIGHT

OBJECT-ORIENTED

DRAWING

PROGRAMS

LAY THEIR CARDS

ON THE TABLE

by Steve McKinstry

Not so long ago, you could mosey down to your local software saloon, yell "Draw," and a feller would slide you a box of MacPaint, MacPaint, or MacPaint. Then QuickDraw showed its interface, brandishing object-oriented drawing tools. At first, the townfolk laughed. The straitlaced stranger couldn't lasso a pixel if his life depended on it. But drawing programs soon showed their stuff.

Because object-oriented drawing programs store images as geometric descriptions rather than as maps of pixels, file sizes are much smaller; image resolution is no longer dependent on the screen's dots-per-inch ratio; and images and type print without jaggies. Nowadays, many Mac artists consider object-oriented programs to be the only game in town.

In this article, we'll look at two kinds of object-oriented programs. Some, like MacDraw II, SuperPaint, Canvas, Drawing Table, and DeskDraw, use QuickDraw for both the screen description and the printer description of a drawing. Others, like Cricket Draw, Adobe Illustrator 88, and Aldus FreeHand, use QuickDraw for screen display and the more refined PostScript page-description language for printer output.

Choosing the smoothest draw is tricky. Not all object-oriented programs draw images in the same way. While all of the

programs reviewed let you use the mouse to create free-form shapes or enter a series of points to create polygons, some let you work with bezier curves—in which you choose the beginning and end points, as well as the direction and shape of the curve. Some can automatically trace bitmapped images and turn them into object-oriented graphics. Others let you divide your work into various layers. We'll also look at the ways in which programs handle typography, color, and printing.

THE ZEDCOR KID

DeskDraw weighs in at a compact 96K, but this desk accessory from Zedcor packs a wallop. While it lacks some functions such as the layering, color dithering, auto-dimensioning, and bezier curves found in more sophisticated programs, DeskDraw does offer a 24-by-24-inch-maximum workspace and, in version 1.4, eight QuickDraw colors. In conjunction with its companion program, DeskPaint, DeskDraw offers excellent autotrace features (see "Traces of DeskDraw"). A unique Forms Trace feature enables DeskPaint to autotrace straight lines from an imported scanned image and then paste the image into DeskDraw with editable object-oriented lines.

DeskDraw is limited to free-form and

PARDNER



across multiple windows without using the Clipboard and the ability to save a group of open windows as a Project file that will reopen in the same configuration.

The program is a strange mixture of oversight and brilliant coups. You can bind text to a path, for example, but you can't mix fonts, sizes, or styles in the same text block; and there is no leading other than single, double, or one-and-one-half spacing.

Drawing Table has no autotrace or bezier curves, but it does offer a refreshing approach to handling polygon and free-form paths. Rather than going to the menu to reshape a polygon, you simply drag the cursor over a shape and a hand icon appears that highlights each point it passes over. You drag the hand to reshape the path. Similarly, a pointing hand adds points and a knife deletes them.

None of the tools have automatic scrolling, and almost every function is dialog-box driven. There are few ⌘-key equivalents and no hierarchical menus. You can double-click on a tool or object, however, to bring up an Attributes dialog box that lets you change color, pattern fills, line fills, and line weights. Double-clicking on a type block lets you change font, size, style, and color.

In Drawing Table, you are limited to

polygon drawing tools, but you can easily add or delete points anywhere on a path with ⌘-Click. Polygons can be smoothed, unsmoothed, reshaped, and filled; but once formed, they can't be split, joined, closed, or opened. Files are saved as PICT and can be opened for additional editing in other programs with more features.

DeskDraw can't compete with all the features in the larger, stand-alone programs, but it may do the trick if you need a lean, clean drawing program that is always as close as your menu bar. This DA is ideal for creating quick-and-dirty im-

ages while you are in an application, and for functioning as a pony express to transfer images to other programs.

THE BRØDERBUND BUNCH

Drawing Table is the newest entry in the object-oriented stable. The program includes an integrated multiwindow management system that makes it easy even for greenhorns to keep their designs straight (see "Drawing Table's Open Windows"). Among other innovations are a Duplication tool that lets you copy elements

STEVE MCKINSTRY

the eight QuickDraw colors, and no custom mixing is possible. You can, however, choose foreground and background colors for patterns and tints, which provides for many color combinations. There are no layering, skewing, or distorting tools, nor are there separation controls. Line weights are entered in fractions or decimals that bear no resemblance to points. For example, a 1-point line is entered as $1/72$ or .013.

Drawing Table's manual is well organized and, like the program itself, seems to have been designed with the novice in mind. Professionals may find Drawing Table too structured and simple for their needs, but for the amateur, the program opens up a world of graphic possibilities.

THE SILICON BEACH POSSE

When SuperPaint first arrived, it blew the competition away by being the first graphics program to offer both bitmap and

object-oriented drawing tools. SuperPaint still offers the simplest interface between the two modes—too simple for some, perhaps. The program is limited to a single layer for drawing and another for painting.

Among the many new features in version 2.0 are bezier curves, a larger drawing area, a dashed-line editor, customizable arrowheads, and a Multigon Tool that lets you set the number of sides for a shape. You have access to the eight QuickDraw colors, but colored images must be viewed using a special preview mode, and there is no separation utility for printing with color.

SuperPaint's AutoTrace feature enables you to trace a template in the paint layer. The template can be hidden while you're drawing, but will print if you leave it in the document. To distinguish it from the tracing line, you can fill it with a lighter pattern using bitmap editing tools (see "Drawing the Lines with SuperPaint").

Polygons can be reshaped but not smoothed. To split a polygon, smooth it, or add and delete points, you must convert the image to bezier format, a process that involves several steps not covered in the hefty, but poorly indexed, manual. Bezier curves start out as free-form paths whose handles show only in the editing mode. Still, SuperPaint offers a great deal of control over points, and you can export bezier paths directly to Illustrator 88, although you will lose things like non-bezier polygons, lines, and text.

SuperPaint offers strong text-handling features. The program lets you mix fonts and sizes in a text block, specify custom leading and point size, and rotate blocks of text in 1-degree increments. There are limitations, however. You can condense or expand type by dragging it with the mouse or selecting the Scale command, but the program doesn't support fractional point sizes, tracking, or kerning.

SuperPaint's multiwindow environment lets you tile, stack, overlap, or hide windows and use floating palettes of patterns and tools. You can fill shapes with standard PostScript gray fills, and the program's SuperBit editing uses virtual memory to create images that match the resolution of your output device.

While SuperPaint lacks dimensioning and multiple drawing layers, it may be suitable for users who need a strong bitmap environment. The program does have one of the smoothest drawing interfaces of those I reviewed, and it has built-in QuickSwitch routines. This will particularly appeal to those using Microsoft Word 4.0, since SuperPaint will ship with each new copy of that program. A direct link between the two programs allows images created in SuperPaint to be quickly updated while in Word 4.0.

QUICKDRAW MACDRAW II

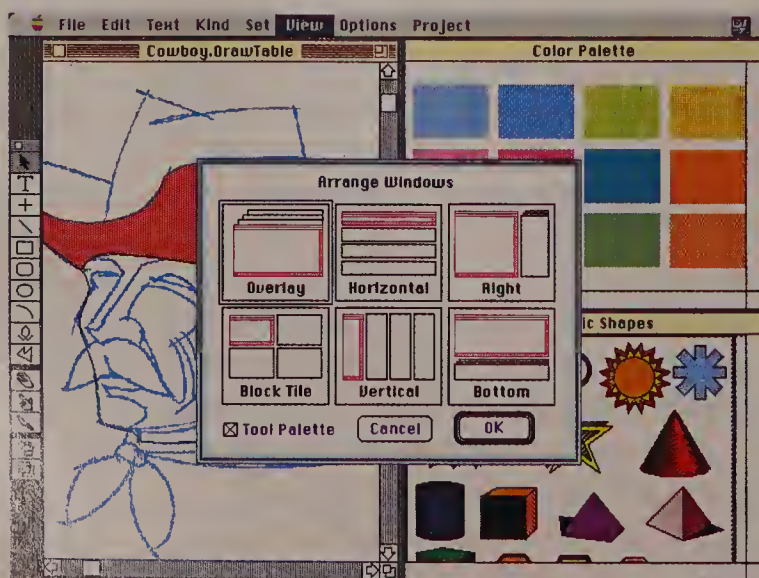
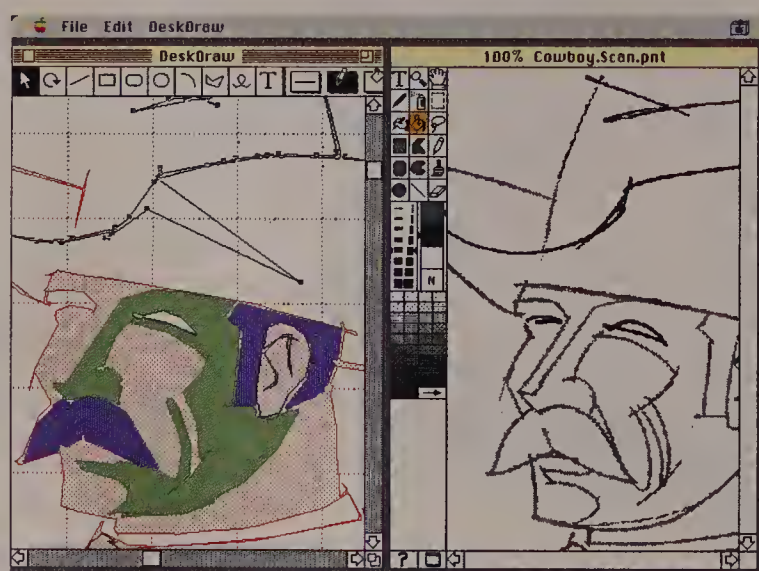
After receiving a lot of press as the first object-oriented program to harness the power of the LaserWriter, MacDraw quickly became the drawing program of choice for newspaper computer graphics. MacDraw II added refinements that allow the veteran program to hold its own with the new guns. Layering, variable line

Traces of DeskDraw

DeskDraw, together with DeskPoint, had one of the better outtrace features I reviewed for tracing variable width lines from imported bitmap and TIFF files. Lines can be outtraced selectively by clicking on them, a feature shared only with Adobe Illustrator 88. Several lines can be selected while using the trace tool and holding down the Shift key. DeskPoint allows ten levels of tracing tool sensitivity. Holding down number 1 on the keyboard before tracing produces the fewest vertices; holding down the number 10 produces the most. You can then copy the image into DeskDraw for editing as a PICT image.

Drawing Table's Open Windows

Drawing Table comes packaged with several color palettes, special border libraries, and a large clip art library from T/Maker. The program's elaborate window scheme easily keeps track of all these resources.



weights, easily reversible type, custom arrowheads, a dashed-line editor, a library to store images, and fractional character widths are all recent enhancements. Layers can now be named, reordered, shown, or hidden; but it is still difficult to tell which layer an individual object inhabits because once you've clicked to a lower layer, those above it are hidden.

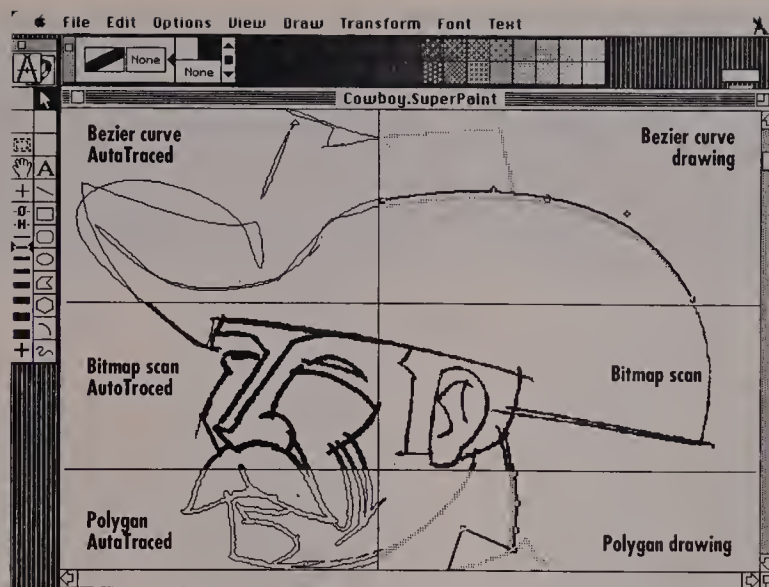
MacDraw II 1.1 has a well-designed align-and-distribute feature as well as nudge keys that move objects in 1-point increments. You can save your settings in a Stationery document—a template that you use to open new, untitled clones. Color is another major enhancement (see “Dithering MacDraw”). MacDraw II can print four-color separations with registration marks, the first program to accomplish this feat with QuickDraw colors. It also includes a spelling checker and the ability to post notes.

But MacDraw does not offer an autotrace tool or bezier curves, and drawing with MacDraw's polygons is cumbersome at best. MacDraw's polygons were the touchiest of any reviewed. Text cannot be scaled with a drawing, and there are no dialog boxes for defining increments for scaling, moving, or rotating objects. Also missing are basic ⌘-key equivalents for often-used features such as Ungroup.

Finally, although MacDraw II 1.1 saves memory by loading only the fonts and sizes you use most often, opening two full-color images in the program would require nearly 1 megabyte of RAM. Still, with its layering controls and color-separation abilities, MacDraw II is a well-proven solution for those in need of a good QuickDraw program.

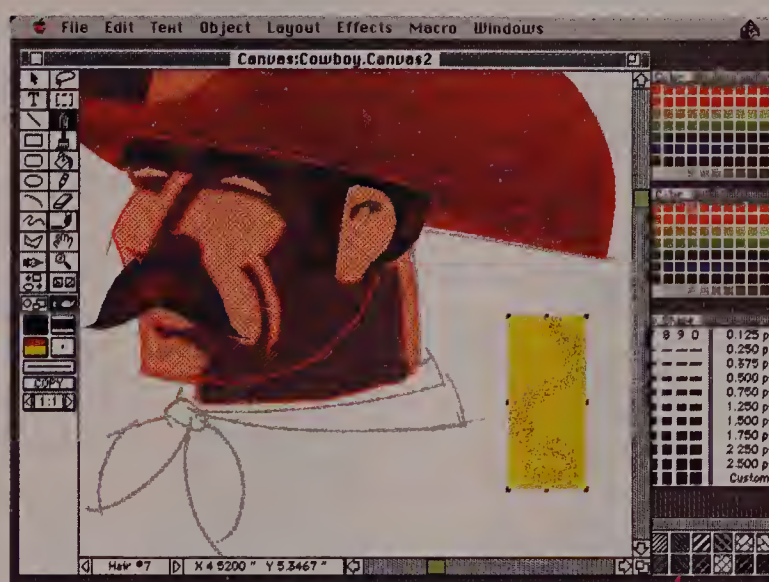
THE CANVAS GANG

Like SuperPaint, Canvas rode into town with both guns blazing—bitmaps in one hand and object-oriented draw tools in the other. In addition, Canvas packs an unexpected bonus, a smaller version of itself disguised as a desk accessory. SuperPaint's interface between the two modes may be smoother, but an impressive body of features and tools makes Canvas the top gun.



Drawing the Lines with SuperPaint

SuperPaint autotraces bitmaps to polygons or bezier curves, and polygons can be converted to bezier format. The example shows autotraced bezier curves with settings for fewer and longer lines, and autotraced polygons with more and shorter lines. Editing in both cases becomes a lengthy trial-and-error process of eliminating the redundant vertices created when autotracing traces both sides of a line.



Framing the Canvas

Canvas can combine pixel-based and object-oriented color on the same drawing in variable resolutions for printing. Color, pattern, line, and pen menus can all be open on screen. You have access to 256 colors for coloring a drawing in Canvas; but with no color separation utility, you must settle for a screen-bound image or for the reproduction quality in screen-recorder or color-printer output.

The outstanding manual offers many cross-references, examples, and handy tips. (If only there were a quick-reference card.) The program itself is equally well organized. To select and edit elements such as patterns, pens, color, scaling, alignment, and rotation you use a combination of ⌘-key shortcuts and dialog boxes called Managers. To bring up the Alignment Manager, for instance, you click on the alignment tool while several objects are selected.

You can autotrace bitmap areas selected with the marquee, but you have no control over points or line tracing sensitivity. Of all the QuickDraw programs tested, Canvas had the easiest polygons to create and edit, and Canvas offers the only polygon that can be continued from an end point after you've deselected it. The program's bezier curves work much like those in Illustrator 88 and FreeHand, even if they do lack the editing control of the PostScript competitors.

Canvas had the most-functional rulers I tested and it definitely wins in the zoom department. Although the maximum enlargement is set at 32x in either direction, I stopped at 134x after a 1-point line filled the screen and became uneditable. The tools were still active, however. Dynamic autodimensioning is another plus.

Canvas offers better layer control than MacDraw. You can gray out layers, print individual layers, and send objects to layers without having to cut and paste. The layer name is always shown and can easily be accessed from the Information Manager status bar. But only one layer can be active at a time, and there is no way to tell which layer an object is on without giving each layer its own color.

You have 16.7 million colors available in Canvas, and you can create custom color libraries from Apple's Color Picker (see “Framing the Canvas”), but Canvas has no facilities for printing CMYK (cyan, magenta, yellow, black) separations, and

DRAWING FEATURES ROUNDUP

	Canvas	SuperPaint	MacDraw II	Drawing Table	DeskDraw	Cricket Draw	Illustrator 88	FreeHand
Company	Denebo Software	Silicon Beach Software	Cloris	Brøderbund Software	Zedcor	Cricket Software	Adobe Systems	Aldus
Version	2.0	2.0	1.1	1.0	1.3 (1.4 soon)	1.1.1	1.8	2.0
List price	\$299.95	\$199	\$399	\$129.95	\$129.95 (with DeskPoint)	\$295	\$495	\$495
Maximum no. of windows	limited to memory	10	7	8	1	limited to memory	limited to memory	limited to memory
Maximum drawing area	81 sq. ft.	72 x 72 in.	100 x 100 in.	42 x 42 in.	24 x 24 in.	8.5 x 14 in.	7 ft. x 7.3 ft.	40 x 40 in.
Move/hide palettes	•	•					•	•
Multiple levels of undo								•
Selection tool autoscroll		•			in v. 1.4	•	•	
Drawing tools autoscroll	•	•	•		in v. 1.4	•	•	•
Autotracing tool	bitmap to polygon	bitmap to polygon			in DeskPoint		•	•
Adjust tracing sensitivity		•			in DeskPoint		•	•
Masking shapes							•	•
Polygon path tools	•	•	•	•	•	•		
Reshape/smooth polygon	•	•	•	•	•	•		
Add/remove polygon vertex	•		unsmooth only	•	•	•		
Cut polygon	•							
Continue path from end point	•							
Bezier path tools	•	•				1	•	•
Erase while drawing	•						•	•
Continue path							•	•
Select/move multiple points		•					•	•
Cut path	•	•					•	•
Custom arrows	6	6	2	4	3 in v. 1.4	3		
Show in-line measure	•		•					
Colors available	16.7 million	8 QuickDraw	8 QuickDraw	8 QuickDraw	8 QuickDraw	8 QuickDraw	CMYK, 700 PMS	CMYK, 700 PMS
Color-mixing method	Color Picker		dithering				CMYK %	CMYK %
Gradient fill						•	•	•
Mix fonts, sizes, & styles	•	•	•			•		•
Bind text to path				•		•		•
Edit fill & stroke							•	•
Kerning	fractional widths		fractional widths	fractional widths				•
Leading		custom space	•	1, 2, 1.5 lines	1, 2, 1.5 lines	1, 2, 1.5 lines	•	•
Measuring system ¹	in, p, pt, cm	in, p, pt, cm, px	in, p, pt, cm	in, p, pt	in	in, p, cm, px	in, p, pt, cm	in, p, pt, di, m
Snap to ruler				•		•		
Maximum no. of layers	limited to RAM	1 Draw, 1 Point	limited to RAM	1	1	1	1	200
Reorder layers	•		•					
Name layers	•		•					
Print layer individually	•							
Color separation			•				w/Adobe Separator	•
Import/export formats ²	A, B, C, D	A, B, C, D (bezier)	A*, B, C, F	A (import), B, C, D (import)	A*, B, D*	AΔ, B, EΔ, F (edit)	A†, B†, C (w/o color), D, EΔ, F	AΔ, B, C, DΔ, E (Illustrator only), F

Note: These comparisons cover only the object-oriented tools of a program unless otherwise noted.

¹ in = inches, p = picas, pt = points, cm = centimeters, c = ciceros, di = decimal inches, m = millimeters, px = pixels.

² A=Point, B=PICT, C=PICT2, D=TIFF, E=EPS, F=PostScript; * = via Clipboard, † = as template, Δ = place.

overlapping areas are not masked out when printing individual layers. And there are problems with type control: Canvas has no leading option, and you can enter only whole numbers into the custom point sizes (a problem that plagues QuickDraw programs). Once you've applied scaling or a special effect (rotate or flip, for example) to text, it's imaged as a bitmap. To edit the text you can choose Restore Original or, in some cases, simply click on the bitmap, but both methods remove all effects. If you scale type first, you cannot apply special effects.

Canvas will win many converts, however. It is a precise, full-featured program that will appeal particularly to people who need well-designed drafting tools.

THE CRICKET CLAN

As the first drawing program to take advantage of PostScript and the LaserWriter, Cricket Draw amazed everyone with its speed and sophistication. After working with MacDraw or SuperPaint, we were wowed by Cricket Draw's blended fills, binding text, rotation, and a host of other innovative features that now seem commonplace amongst PostScript programs. The program hasn't changed radically in recent years, but it is still a good program with features others don't offer—a PostScript editing window, special starburst and grate tools that can be customized for unique shapes, a nice transfer mode for regulating the frequency and angle of screens, very quick dialog boxes, and automatic shadow-box generation.

Cricket Draw's polygons are much like those of its QuickDraw cousin, MacDraw II, but they are easier to use. You can't add points to an existing line, but you can add new vertices by Option-clicking on an existing one and then dragging it to its new position. You delete vertices and open and close polygons by using simple key commands.

You can regulate nudge-key movement for controlling free-form drawing and creating polygons, but there are no autotrace settings and only one bezier curve for creating single arcs that can't be joined to others (see "Hide and Seek with Cricket"). Using a keyboard shortcut you

can increase or decrease type size in 1-point increments; and a Status box shows height, width, length, angle, percentage, change in height and width, and current zoom field. You can bind text to a curved path, but you won't be able to see it or edit it on screen.

Cricket Draw is showing its age. It has no hierarchical menus, text must be edited at actual size, leading is unavailable, and there is no fill or stroke for text. There is only one bezier curve and it can't be joined to other line forms. You have access to only the eight QuickDraw colors and you cannot create color separations. But at a good \$300 less than Illustrator or FreeHand, Cricket Draw does offer PostScript features at QuickDraw prices.

EL ADOBE GRANDE

Adding double-handled bezier curves to established PostScript routines, Adobe Systems created Illustrator, a drawing program that quickly found itself on many Most Wanted lists. Illustrator 88 version 1.8 upped the ante. Enhanced features were balanced by the need for 2MB of memory and a hefty budget.

Illustrator 88's strong points are its tools for precision drawing control and its ability to handle type and color. Other drawing programs now incorporate bezier curves, but Illustrator 88 beats them all with refinements such as the ability to snap to a point, a ruler with tick marks every $\frac{1}{4}$ point, and zoom levels of up to 32x. Illustrator 88 barely edged out DeskDraw for best autotrace abilities; it can't force a straight line from a slanted one, but lines are in PostScript format, not PICT. Because sensitivity is adjustable, you can avoid picking up unwanted vertices and it's easy to choose the lines you want to autotrace—you just click on them. Although Illustrator 88 traces only one side of a line at a time, the release of Adobe's Streamline, a separate autotracing utility, should solve this problem.

Some programs have menus that appear to be more generous, but Illustrator 88's type and object controls have been boiled down to a few simple menus with many functions hidden behind subtle mouse and keyboard commands. To size

NEW SIDEKICKS

Upgrades to two of the products discussed in this article may be on the shelves by the time you read this. Cricket Software is announcing Cricket DrawMaster, an application that promises to add ease-of-use features, greater speed, a comprehensive text processor, full color support (8-bit or 32-bit QuickDraw), and access to PostScript effects. In addition, any image created with the usual drawing tools—line, rectangle, oval, and arc—can be transformed into bezier path segments for fine-tuning. And drawings can now be as large as 55 square inches. Cricket DrawMaster will retail for \$295, and upgrades from Cricket Draw will be available for \$99.95. (Free upgrades are available to those who purchased Cricket Draw between April 1, 1989, and the release date.)

Deneba is working on a utility program that allows users to convert Canvas files to PostScript format, complete with true CMYK separations. And you can print the files right from the utility. Among the enhancements to Canvas itself is a new dashed-line manager and improved control of bezier paths—the control points are no longer constrained to the tangent line. The upgrade and utility will be available to registered Canvas users.

a rectangle automatically, for example, you choose the rectangle tool and click anywhere in the drawing area to bring up a dialog box that lets you enter height, width, and curved-corner radius.

With the advances in typographic controls in QuickDraw programs, Illustrator's PostScript lead is getting narrower, but the program is still ahead of the pack. You still can't bind text to a path or justify blocks of text. Fonts and sizes cannot be mixed in the same block, and there's a 256-character limit.

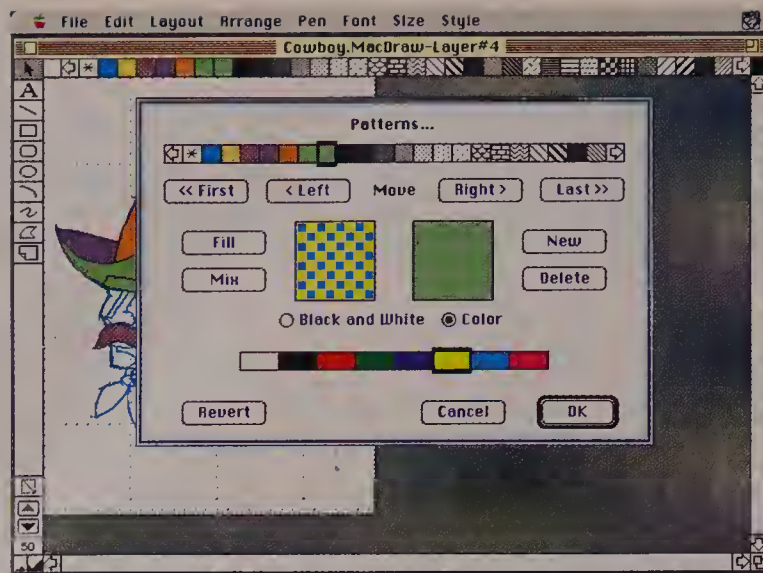
Layering is limited to Send to Front and Send to Back; there's no way to hide individual layers other than grouping and hiding selected objects. *Masking*—the process of nesting one image inside an-

Dithering MacDraw

Color in MacDraw is limited to the eight QuickDraw colors, but they can be mixed through dithering for a variety of effects and patterns. Colors can't be loaded from other programs, but mixed colors can be saved in a Stationery document.

Seeing Double with Illustrator

To see changes in color, you must use a second window called New View. Notice that Illustrator's tight control over steps results in a smooth blend.



other and clipping away the overlap—is a valuable feature, but it requires more steps than it should, and the outlines of nested images remain visible and add to screen clutter. Creating blends is also a fairly complicated process, but Illustrator 88's controls do allow you to minimize banding.

You can preview color images, but you can't work with them directly. You must use Illustrator 88's New View feature to create a color preview window to watch the changes you're making in the working window (see "Seeing Double with Illustrator").

Illustrator 88 fully supports CMYK color, and you can export images as encapsulated PostScript (EPS) files to desktop publishing programs such as XPress for four-color separation in one publishing package. Colors are set one-by-one as Process, Custom, or Patterned fills (tiles). Over 700 PMS (Pantone Matching System) colors are available in a lookup table.

Custom colors remain resident in the document in which you create them, but you can save the document as a template if you don't want to recreate the colors.

While Illustrator 88 doesn't generate separations, Adobe Separator, which comes with the program, does. In order to separate PMS and custom colors into four-color plates, you must first convert them to process colors. You can also output to negative or

positive film on a linotronic typesetter. With its manual, Illustrator provides a prepress primer and an excellent color guide as well as a breakdown of CMYK color combinations, printed from Illustrator 88 separations.

Another program supplied with Illustrator 88 is Drawover, a conversion program that turns PICT files from any QuickDraw program into Illustrator format. Although patterns, text, and color are lost, the converted lines can be imported as bezier curves.

THE ALDUS BAND

While Illustrator frightened most of the QuickDraw gang back to the ranch to look for more firepower, a lone ranger was preparing to take it on. Adobe may have given us PostScript, but Altsys of Plano, Texas, came up with EPS formats. When Altsys turned its drawing package over to Aldus, FreeHand emerged as a for-

midable contender, bearing the same price tag as Illustrator 88 and offering similar features. The two have been duking it out ever since.

FreeHand 2.0 attacked Illustrator at its weakest points. FreeHand has a customizable sheet size up to 40 inches by 40 inches and a pasteboard where objects can be stored. A bleed size can also be figured into the page setup. FreeHand understands that to err is human; and to forgive, it gives us Undo. In fact, you can select up to 99 consecutive undos. All other programs offer just 1. This is a great feature, even if it does eat up considerable memory.

FreeHand's scaling, reflecting, skewing, and rotating tools are similar to those of Illustrator, but FreeHand generally offers more options in the dialog boxes. And you can toggle between the arrow tool and any other tool using the ⌘ key or the number keys.

Masking is simple. Just position the object to be nested over the object that will mask it. Cut the object to be nested, select the mask, and choose Paste Inside from the Edit menu. You can group and mask several items in this manner. Cut Contents reverses the process.

Best of all, you can work in color-preview or wire-frame modes. This makes a heavy demand on memory, but is a more natural process than Illustrator's. To help keep things in order, you can create up to 200 layers and work on all of them at the same time. Clicking on an object registers its layer position in the status line, and you can send an object to any other layer. Despite the fact that you cannot name or reorder layers, FreeHand's layering controls offered the most functionality of any I reviewed.

There's full support for CMYK color, plus over 700 PMS colors that can be selected and converted to CMYK values. You make separations from within FreeHand, and you have control over printing, registration marks, plate names, negatives, inks, and screen angles. When you create your own CMYK colors, you can save them in a style menu and apply them to other text, lines, and objects. Using a special format, you can save these colors as libraries or templates. Color blends for

complex or unusual shapes are similar to those in Illustrator 88, but you can't specify the number of steps. For simple gradations, you merely choose two colors and the direction of fill. Besides custom color fills, there are custom pattern, radial, or PostScript fills (see "Grading FreeHand"). FreeHand comes with several preprogrammed PostScript fills and a PostScript window for creating more.

It is in its robust typographic controls that FreeHand really shines. You create type in a dialog box; fonts, sizes, styles, and color can be mixed in the same text block. Each block holds up to 30K and can show a representation of the type you've selected or a default style. There are also controls for manual kerning, letter and word spacing, horizontal scaling, justification, baseline offset, and custom point sizes, with leading in any fraction of a point. In addition, type can be edited when it's scaled, rotated, skewed, reflected, or bound to a path.

FreeHand's autotrace, free-form, and bezier tools lack the fine control found in Illustrator. FreeHand paths are hard to join and handles are difficult to grab. But unique Highlight and Contrast controls let you adjust TIFF scans for clean tracing, and FreeHand offers more control over the points that make up its bezier lines. Points can be defined as curves, connectors, or corners that can be changed at any time from the Element Info dialog box; paths can be automatically closed or opened from the same box. Points can be erased as you draw and lines can be continued by selecting the end point and renewing the path.

THE FINAL ROUNDUP

I suppose you're itching to find out who I think is the fastest draw. It's a tough call. For mechanical drafting and architectural applications, Canvas would be my choice. It features excellent measuring tools and

the highest degree of precision this side of CAD. Its color and layering are well suited for impressive color slides and for printing color-keyed layers, for example to show plumbing and electrical levels in a building.

While Canvas provides an inexpensive QuickDraw solution, Illustrator offers technical illustrators and designers a superior selection of precision drawing tools along with full color control and separation abilities for printing.

For the artist doing small black-and-white newsletters, technical documentation, or graphics requiring a bitmap environment, SuperPaint's drawing and type tools come with an easy-to-use interface. Cricket Draw is also a good choice, if you need an inexpensive PostScript program.

MacDraw is the QuickDraw compromise for graphic artists working in the print media. SuperPaint and Canvas challenge it in several areas, including price, but MacDraw is already used in many networked media arenas; it can create simple, quick separations; and it does have that all-important spelling checker. If Canvas offered true CMYK separations, it would outdraw MacDraw, but PostScript programs would still leave them both in the dust. Although Illustrator 88 stands out, FreeHand can be a better choice in this environment, offering superior layering, color, typography, and point control. When facing a tight deadline, FreeHand is the better choice.

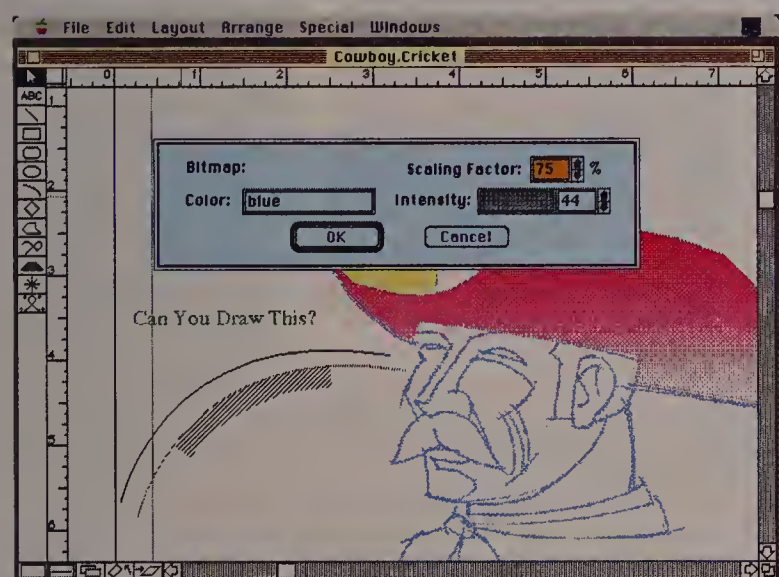
Drawing Table is a good choice for nonartists needing to create decent images. The price is right, and the program's innovative features and multiwindow environment make it easy to use.

And what do I use? I use several. Illustrator is best for the initial stages of a line drawing. I may then import a drawing to FreeHand to take advantage of that program's abilities. I use FreeHand or Adobe Separator to do the separations, or I export the image to a desktop publishing program. DeskPaint and DeskDraw are great for all kinds of utility functions, from editing templates to autotracing.

What if I were forced at gunpoint to choose just one? It would be FreeHand. But that's today. There's always faster on the draw tomorrow. **M**

See Where to Buy for contact information.

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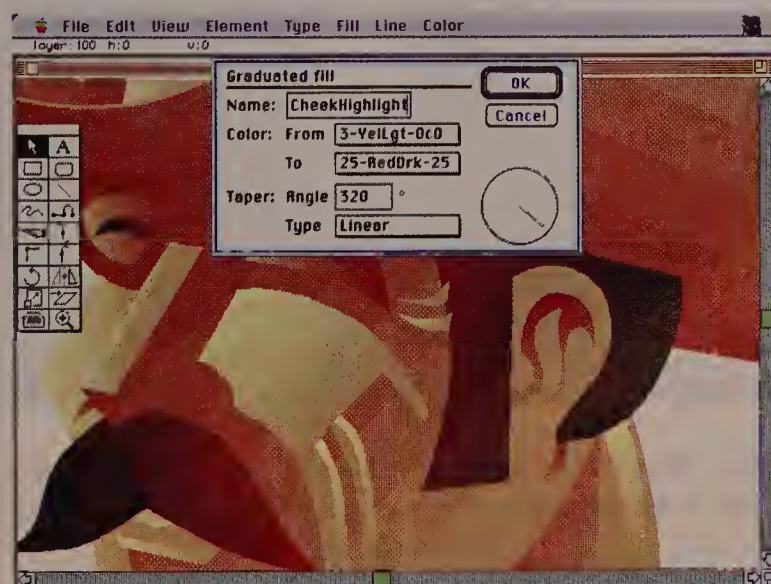


Hide and Seek with Cricket

In Cricket Draw, templates can be scoled and colored for tracing, but they cannot be hidden. They can be locked. To distinguish the template from the rest of a drawing, you can shade it by adjusting its gray intensity.

Grading FreeHand

Gradations in FreeHand are simply a matter of drawing a shape, selecting the beginning and ending colors, and specifying the angle of fill.



SCREEN TESTS

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BY ADRIAN MELLO



The MegaScreen 2008 (left) and the E-Machines T19 (right) are both top picks. These monitors combine top-notch image quality with high vertical refresh rates so that images are not only visually accurate and appealing but stable as well.

Macworld

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auditions

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12 color

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displays

Not everyone can make it on the big screen. An actor must be larger than life and radiate that unfathomable essence called star quality. If you own a Mac II, you too can make it on the big screen—not as a celebrity, but by creating brilliant color images that add unsurpassed glamour to your day-to-day computing.

Macworld tested 12 color display systems for star quality. We included only systems that combine an 8-bit video board with a monitor. We excluded 24-bit displays, as well as color solutions for the Mac SE and SE/30. Our evaluations included 19-inch and 20-inch monitors from E-Machines (T19 and C20), MegaGraphics (MegaScreen 2008), Moniterm (Viking 21), PCPC (PCPC II), Radius (Color Display System), RasterOps (1948H and 1948S), and SuperMac (SuperMac 19" Color Monitor), as well as two 16-inch monitors from E-Machines (TX, T16). The smallest monitor of the lot, the Apple 13-inch color monitor, was included mostly as a point of comparison because it's familiar to many users. We also looked at a 19-inch Taxan Ultra Vision 1000 with the new Taxan ColorVision II board but did not include it in our final evaluation because although the board is now shipping, it was still a preproduction unit at the time of our tests.

THE AUDITIONS

Image quality is by far the most important criterion in selecting a monitor. It's also the most difficult to judge. Display systems offer various different hardware and software features (see "Color Monitors at a Glance"), but most people choose a monitor based on how well it displays

color images. To determine which color systems produce the best images, we used a combination of objective and subjective tests. It's important to keep each in its place.

Image quality is determined by several diverse characteristics. Although many of these characteristics can be measured objectively, such measurements won't tell you which color display produces the best color images. Objective tests provide useful background, but subjective tests are better for providing an overall quality evaluation.

We conducted the objective tests in our lab using instruments such as the Klein Convergence Meter and the Minolta Color Analyzer to measure misconvergence, brightness, tracking, linearity, color range, and color purity. The results of these tests are shown in "Color Monitors at a Glance" and "Image Objectives." Each monitor had a 30-minute warm-up period before we took any measurements. Using several other procedures and test-pattern software, we tested for distortion, focus quality, pincushioning, ghosting, and voltage regulation. The results of these tests are discussed in this article.

Ultimately, a monitor generates images for human viewing—a highly subjective activity. A gathering of 12 *Macworld* staffers rated the monitors for several characteristics (see "Searching for the Right Image"). We also judged how well the monitors held up when displaying images that users might view during day-to-day use, including images produced by color paint programs, gray-scale editing programs, and CAD programs.

SIZING UP IMAGES

One of the main reasons for purchasing a large color monitor is size—not because it lets you intimidate your colleagues, but because it displays large color images. With the exception of the 13-inch Apple display, the monitors examined here let you view a relatively large image on screen without scrolling. The 19-inch monitors are physically daunting, weighing as much as 97 pounds and taking up a lot of desk space. I recommend purchasing a monitor stand from a vendor such as Kensington to make the best possible use of your desk space. The two 16-inch monitors from E-Machines are a good compromise for people who find a 19-inch monitor too big.

The amount of detail you can view at once is determined by a monitor's resolution. Resolution is the maximum number of lines (down) and pixels (across) you can view on screen. It's also important to consider the monitor's pixel density (measured in dots per inch or dpi). Many monitors display 72 dpi—the dot density of the original Mac. Monitors with higher pixel densities can display a large image

COLOR MONITORS AT A GLANCE

	Apple	E-Machines	E-Machines	E-Machines	E-Machines	MegaGraphics	Monitorm
Monitor	AppleColor High-Resolution RGB Monitor	T16	TX	T19	C20	MegaScreen 2008	Viking 21
Screen size (diagonally, in inches)	13	16	16	19	20	19	21
Picture tube	Sony Trinitron	Sony Trinitron	Sony Trinitron	Sony Trinitron	Hitachi	Sony Trinitron	Toshiba
Display area (hor. x vert., in inches)	8.9 x 6.7	11.61 x 8.71	11.73 x 9.25	13.47 x 10.63	13.47 x 10.63	13.65 x 11	14.2 x 10.7
Maximum resolution (pixels x lines)	640 x 480	832 x 624	1024 x 808	1024 x 808	1024 x 808	1024 x 826	1024 x 768
Dot density (in dpi)	72	72	85	75	75	75	72
Dot pitch (in mm)	0.25	0.26	0.26	0.31	0.31	0.338	0.31mm
Vertical refresh rate (in Hz)	66.7	67	72	72	72	68.9	60
Horizontal scan rate (in kHz)	35	45	60	60	61	59.52	48
Bandwidth (in MHz)	23	50	80	80	80	80	65
Type of phosphor	P22	P22	P22	P22	P22	P22	822
Dimensions (h x w x d)	11 x 13.5 x 15.2	14.9 x 15.9 x 18.7	14.9 x 15.9 x 18.7	18.8 x 18.7 x 21	18.9 x 19 x 21	17 x 19 x 20	19 x 21 x 25.25
Weight (in pounds)	34	60	60	86	77.7	76	85
Tilt swivel stand	no	yes	optional	yes	yes	optional	yes
Virtual screen capability	no	no	no	no	no	no	no
Brightness control	yes	yes	yes	yes	yes	yes	yes
Contrast control	yes	yes	yes	yes	yes	yes	yes
Degauss control	yes	automatic	automatic	automatic	yes	automatic	yes
Vertical position control	no	no	no	no	no	no	yes
Horizontal position control	no	no	no	no	no	no	no
Horizontal size control	no	no	no	no	no	no	yes
Vertical size control	no	no	no	no	no	no	yes
Horizontal convergence control	yes	yes	yes	yes	no	yes	no
Vertical convergence control	yes	yes	yes	yes	no	yes	no
Centering	no	no	no	no	no	yes	no
Antiglare treatment	yes	yes	yes	yes	no	yes	yes
Worst misconvergence from center (in mm)	0.07	0.10	0.11	0.07	0.10	0.04	0.15
Worst misconvergence from corner (in mm)	0.15	0.20	0.27	0.60	0.35	0.47	0.55
Maximum brightness (in fL)	24.70	27.50	36.50	24.70	28.10	24.90	33.80
Warranty period	90 days	one year	one year	one year	one year	one year	one year
Total system price	\$1647	\$3895	\$4495	\$6195	\$5295	\$6090	\$5590

in a smaller area while retaining detail. However, the image is necessarily smaller, making text and detail more difficult to read.

The Radius Color Display System displays 82 dpi, making the text a bit too small for me to accept for word processing but probably adequate for text details in other applications. At 75 dpi, the density of the E-Machines T19 and C20 will be slightly higher than 72 dpi, but will be quite acceptable to everyone but purists. E-Machines' TX compresses the same high-resolution image onto a 16-inch monitor, yielding a dot density of 87 dpi. Most people won't find this monitor acceptable

for text-intensive applications like word processing and spreadsheets, but it provides an interesting trade-off for applications where image detail is more important than image size. E-Machines' T16 has the same size screen, but with a dot density of 75 dpi it doesn't cram as much detail in the same space.

ONE BRIGHT SPOT

A monitor's brightness can affect the color in an image. Furthermore, different people prefer different brightness settings. Some, like me, prefer to work with a very bright display. The amount of brightness you

require will also depend on the lighting in your work space. Here are some general guidelines. If the room is dark you can get away with a measurement of 10 foot-lamberts. A room of average brightness will require 20 foot-lamberts; a room with a lot of windows will require 30 foot-lamberts (see "Color Monitors at a Glance").

If you work near a window or an otherwise brightly lit space you may spend more time looking at your own reflection than your work on screen. Most monitors have some type of screen etching or antiglare coating to minimize glare; but these features cannot overcome poor monitor positioning or high-glare envi-

PCPC	Radius	RasterOps	RasterOps	SuperMac
PCPC II	Color Display System	1948H	1948S	SuperMac 19" Color Monitor
19	19	19	19	19
Sony Trinitron	Sony Trinitron	Hitachi	Sony Trinitron	Sony Trinitron
14.2 x 10.7	14.05 x 10.76	14.2 x 10.7	14.2 x 10.7	14.2 x 10.7
1024 x 768	1152 x 882	1024 x 768	1024 x 768	1024 x 768
72	82	72	72	72
0.31	0.31	0.31	0.31	0.31
60	72	60	60	60
48.76	65	48.8	48.8	48.78
64	100	65	65	100
P22	P22	P22	P22	P22
18.7 x 18.9 x 21.1	18.8 x 19 x 21.1	18.7 x 19.9 x 19.7	17.6 x 18.9 x 22.2	18.0 x 19.0 x 20.0
84.9	79.3 oz	77.16	80	79.2
yes	optional	yes	optional	yes
yes	no	yes	yes	yes
yes	yes	yes	yes	yes
yes	yes	yes	yes	no
automatic	automatic	yes	automatic	automatic
no	no	no	no	yes
no	no	no	no	no
no	no	no	no	no
no	no	no	no	no
yes	yes	no	yes	yes
yes	yes	no	yes	yes
yes	yes	no	yes	yes
yes	yes	yes	yes	yes
0.07	0.25	0.15	0.10	0.06
0.20	0.40	0.30	0.25	0.25
29.00	27.90	33.00	25.10	20.40
one year	one year	one year	one year	one year
\$5545	\$6190	\$4790	\$5690	\$6096

ronments. Some monitors also come with stands that let you tilt or swivel the monitor to give it the best possible position.

Most monitors have contrast controls, and some have brightness controls. All E-Machines monitors come with a handy software utility for this purpose. Some monitors provide a degaussing button to remove a magnetic disturbance called Gauss effect. Sony monitors automatically degauss on start-up.

CLARIFYING FOCUS

Most of the editors who participated in the subjective tests rated focus as the most

important consideration in selecting a monitor. This is no surprise from a group that works with text most of the day; clear focus makes it easier to see and interpret graphics details and text (especially in sizes smaller than 14 points). Focus is also important for CAD and other applications where interpreting small details is essential (although one art department staffer weighted tracking and purity more heavily than focus because she doesn't often work with text).

In the subjective tests we rated each display for the quality of the focus at the center of the screen and along the edges. The Apple monitor rated the highest

because of its exceptionally good edge focus. Good focus is, of course, more difficult to accomplish in larger monitors. However, several other monitors did almost as well as the Apple display: the E-Machines TX, the E-Machines T19, the MegaScreen 2008, the PCPC II, and the SuperMac. The Monitorm Viking 21 was judged to have the worst edge focus; the E-Machines C20 was judged to have the worst focus at center.

Poor focus can partly be a result of *misconvergence*, the degree to which the red, green, and blue beams are out of alignment. Serious misconvergence results in lines and text that have a discernible color shadow. We used a Klein Convergence Meter to measure the misconvergence of the red and blue beam from the green beam, both horizontally and vertically from center and from each of the screen's four corners (see "Color Monitors at a Glance" for measurements). Misconvergence becomes a concern when the color shadow's width is greater than 0.05 millimeters at the corners and 0.03 millimeters at center.

TRACKING DOWN TINTS

There were obvious differences in the overall color of the screens. Some had a greenish cast, some looked pink, some looked brown. Each monitor's idiosyncratic tint is determined by the type of phosphor it uses and its *tracking* ability. Tracking is the balance between the voltage intensities of the three color beams. You can detect tracking problems by examining a blank background at different *gray levels*. Gray levels are different intensities of white; color monitors produce white by evenly balancing the intensity of each of the color beams. A significant variation between the beams means that colors won't be mixed evenly and that the gray level will be colored in some fashion. The overall color bias of the screen becomes more pronounced at darker gray levels.

We examined the monitors for tracking deviations at both 25 and 50 percent gray levels (for objective test measurements see "Image Objectives"). The Radius Color Display System was the clear

IMAGE OBJECTIVES



Macworld Labs performed several objective tests to measure different facets of image quality. The charts below show the results of tests performed to measure tracking, gray linearity, and purity for each monitor. Keep in mind that the results of objective tests don't always agree with subjective impressions. While objective tests provide useful background, it's important not to take the results out of context when making a purchasing decision.

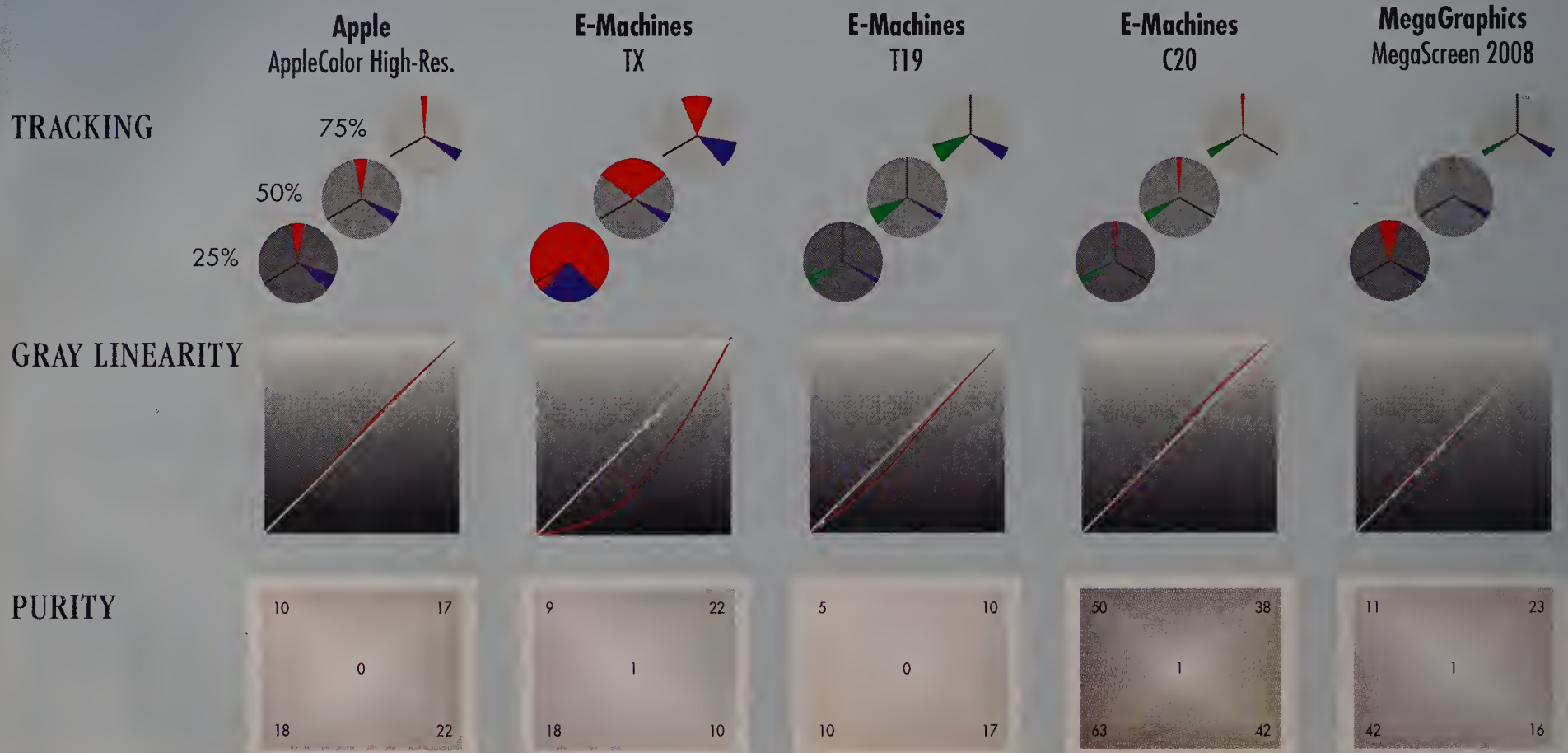
Tracking

The top chart shows the results of our tracking measurements. Tracking is the balance between the voltage intensities of a monitor's three color beams. Each of the three small circles shows the balance between the red, green, and blue beams at a different brightness level. The measurements were indexed to show the relative differences between the intensities of the three beams. In each circle one of the three color segments has no

width; that color has the weakest beam and is the starting point for assigning the color contributions. The width of the other two color segments in each circle indicates the degree to which those beams overcontribute to the color mix. The wider the color segment, the worse the overcontribution.

Gray Linearity

The middle chart demonstrates the gray linearity of each monitor. Perfect linearity is represented



favorite in the tracking tests. Most editors went out of their way to comment on the excellent quality of this monitor's grays. The PCPC II was a clear second place; the E-Machines T19 came in third.

The RasterOps 1948H and the E-Machines C20 were described by most people as green, and some people did not like this color. The PCPC II, MegaScreen 2008, E-Machines T19, and SuperMac monitors were all described favorably as slightly blue or blue gray, with the SuperMac graduating to an obvious teal at 25 percent. The RasterOps 1948S was brown, and a few editors disliked this color. The

Viking 21 was described as yellow brown—another unpopular color.

The Apple monitor, the T16, and the TX were described by all editors as pink at 50 percent and plum or mauve at 25 percent. The particularly strong red bias of the T16 turned out to be a misadjustment that had occurred in shipping. And after being adjusted, the T16 produced an entirely acceptable gray. Monitors can suffer serious adjustment problems during shipping. If you notice a problem, it's worth asking your dealer to readjust the monitor to meet the manufacturer's specifications. (Some manufacturers, such as E-Machines,

prefer to have the monitor sent back to them in case there are any serious problems due to an out-of-spec monitor.)

GRAY LINEARITY

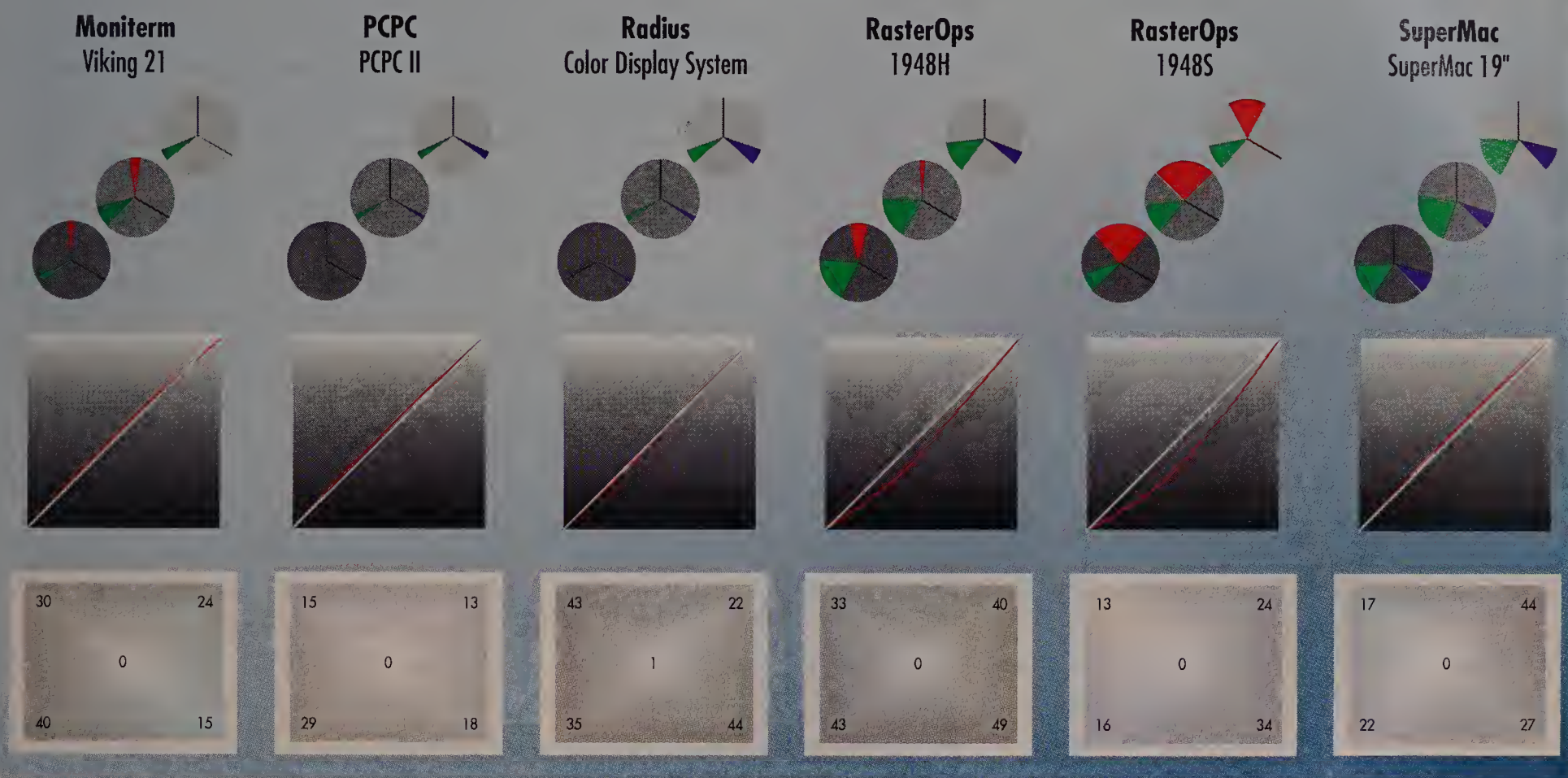
Although color monitors can display gray-scale images, these images are usually inferior in quality to those displayed by dedicated gray-scale monitors. Gray-scale monitors are generally more accurate because they use only a single beam at different voltage intensities to produce gray levels. To accomplish the same result, a color monitor must combine three

by a white line that divides each rectangle diagonally at 45 degrees. The red line illustrates the monitor's actual linearity; the closer it follows the white line, the better the gray linearity. The horizontal axis represents intended brightness level and the vertical axis indicates actual brightness level climbing from minimum brightness in the lower left to maximum brightness in the upper right. To create the line chart we interpolated tracking values at several gray levels.

Purity

Purity, shown in the bottom series of charts, is the color variation between different areas of the screen. We tested for color variation by measuring the red, green, and blue beams at the center and each of the four corners of each screen as it displayed a background color of 100 percent white. We then indexed each measurement by taking the root-mean-square of the deviation from whiteness. For each monitor the indexed

number appears at the center of the screen and each of the four corners. The greater the deviation from whiteness, the larger the number. Individual measurements are not as important as the degree to which these measurements vary among locations on a single monitor. The coloring within each chart is a representation of the screen's purity variations, not an accurate depiction. The coloring and the blending have been enhanced and simplified for legibility.



color beams—more difficult since it requires greater accuracy to coordinate the separate beams.

Nevertheless, a color monitor's ability to render gray-scale images is worth evaluating, because it indicates how evenly the monitor displays color images at different levels of brightness (see "Image Objectives" for technical measurements). We rated the Radius monitor first on gray scale, with the PCPC II close behind. Most of the other monitors did reasonably well with the exception of the E-Machines C20, which received a somewhat lower mark by comparison. The RasterOps 1948S, the

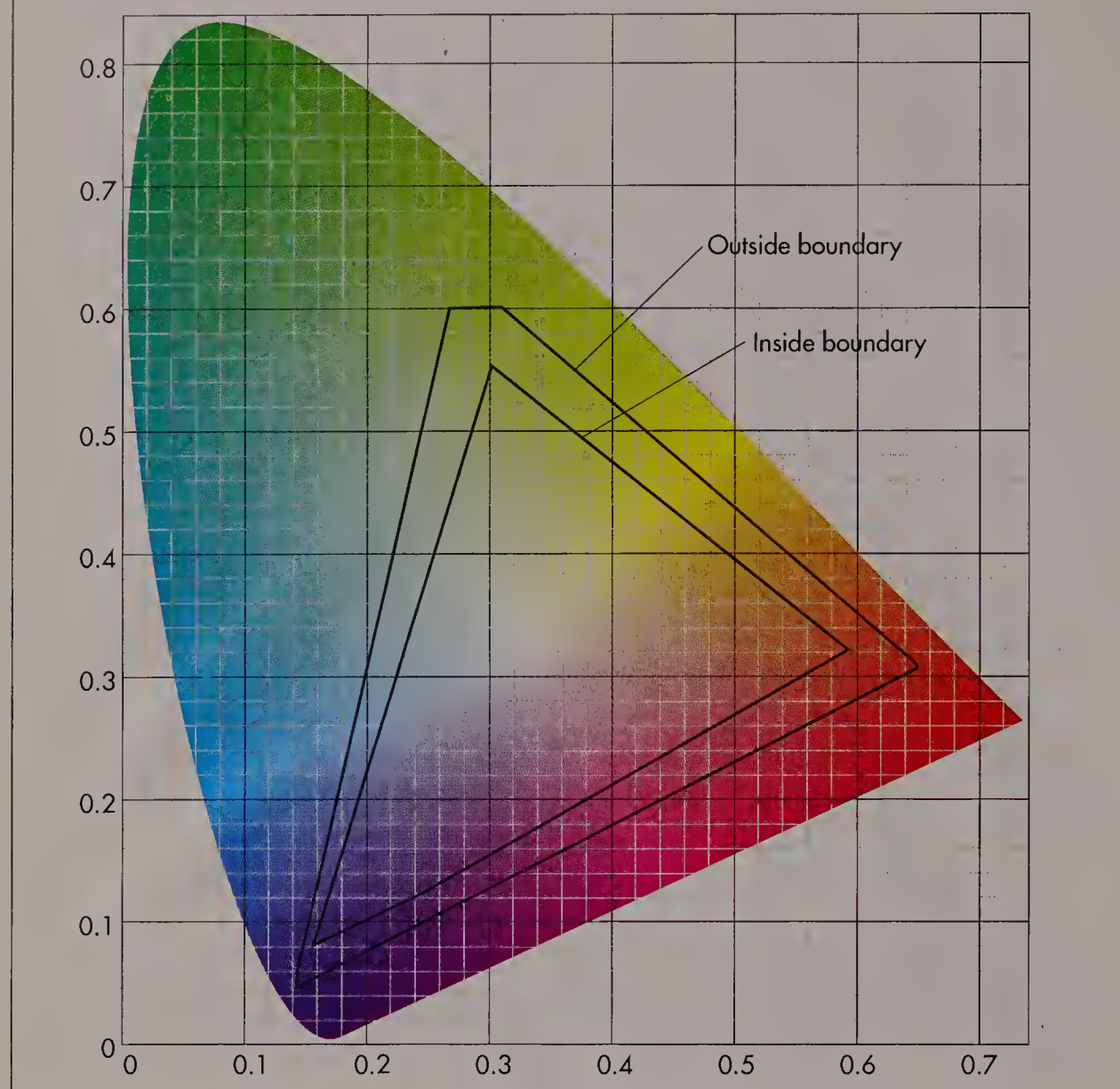
Apple, and the MegaScreen 2008 were also singled out for favorable comments.

PURITY

Different areas of the screen can demonstrate color variations. A specific area of the screen may have a noticeably different tint than other areas of the screen. Purity variations are usually subtle and insignificant. But a serious purity deficiency can be one of a color monitor's most damning weaknesses, muddying the color and making it difficult to identify details in the obscured portion of the screen.

We measured all the monitors for purity variations at the center of the screen and at each of the four corners (see "Image Objectives"). We also examined the monitors for purity variations by viewing a screen displaying a white background at full brightness. The best performers were the E-Machines T19, the MegaScreen 2008, the PCPC II, and the Radius Color Display System. The T19 received the most effusive compliments, with comments like "luminous" and "very good—five stars!" The Viking 21 was the only monitor with a serious purity problem. The Viking 21 was labeled by many

THE COLOR SPECTRUM



Macworld Labs measured the red, green, and blue color coordinates for each monitor and plotted them on this composite chromaticity chart. Since most of the monitors we tested had a similar color range (produced a similar degree of saturation), we show only the outside and inside boundaries of the color range for all tested monitors. The Sony monitors all fared well in the red spectrum. Overall, the SuperMac monitor had the widest color range and the E-Machines C20 had the smallest.

editors as “dirty” or “splotchy,” and was unanimously described as having darker areas on the sides and corners.

The E-Machines T16 originally had an obtrusive, dark pink blotch on the right side of the screen. After discovering the adjustment problem mentioned under tracking, above, we decided that the purity evaluation might also be incorrect. Once we readjusted the T16, the purity was much better. The upper-right corner was still slightly darker, but not noticeably. At that point, we no longer had time to retest the T16 for objective measurements, so we decided to leave out our first set of data from the accompanying graphics.

COLOR IMAGES

Isolating a monitor’s imaging characteristics is important, but in the end color monitors are used to display real images. To balance our evaluation we looked at images from color paint and CAD programs and rated the quality of the display for color range, vividness, and general appearance. Each monitor’s contrast and brightness were adjusted to optimize image appearance.

The results show that testing for specific characteristics such as purity, tracking, and focus do not always correlate with users’ responses to real images. The best examples of this were the two Raster-

Ops monitors. Both had comparatively unimpressive results in the clinical tests, but did exceptionally well when displaying actual images. Editors who had commented negatively on the heavy tracking bias toward brown on the RasterOps 1948S (Sony) and the bias toward green on the 1948H (Hitachi) were nevertheless favorable about the quality of the color images. The RasterOps 1948S monitor was especially impressive because it outperformed more accurate monitors when displaying color paint images. It did not do as well when displaying CAD images, reflecting the monitor’s weaknesses in tracking, purity, and focus. Conversely, the SuperMac monitor did only a reasonable job of displaying paint images but did much better on the CAD images because of its sharp focus.

The Apple monitor did well on all types of color images despite the screen’s pinkish quality. Once again, the T19, MegaScreen 2008, PCPC II, and Radius monitors gave strong performances in the display of all types of color images (with the Radius monitor being somewhat weaker with CAD images because its focus is not quite as good). This versatility parallels these monitors’ strong showings in the clinical tests. Although the editors were not as critical when they were looking at real color images as when they were looking for tracking and purity performance, they did single out two monitors, the E-Machines C20 and the Viking 21, as being “flat,” “weak,” “washed-out,” and “dull.”

IMAGE STABILITY

A beautifully rendered color image may move you, but it shouldn’t move itself. It’s annoying and fatiguing to look at a screen when images are subject to flicker, ghosting, voltage shrinkage, and other instabilities. With flicker, the screen flickers rapidly like a cheap movie projector. The key measurement for flicker is the monitor’s vertical refresh rate. According to a research study performed for IBM by Watson Laboratories, 50 percent of all people can detect flicker at a vertical refresh rate of 60 hertz, while fewer than 10 percent can see flicker at a rate in

SEARCHING FOR THE RIGHT IMAGE

	Focus	Tracking	Gray-scale Image	Purity	Color Images	Flicker	Quality Total	Price-Independent	Price-Dependent
Apple	1.3	3.6	1.9	3.4	1.9	1.4	2.3	3.0	1.3
C20	3.1	2.3	4.1	3.0	3.9	1.3	3.0	3.2	3.8
MegaScreen 2008	1.5	2.2	1.8	1.6	1.7	1.3	1.7	1.8	1.7
1948H	2.5	4.12	2.8	3.3	2.5	2.7	3.0	3.3	2.3
1948S	2.3	3.2	1.9	2.6	1.8	3.5	2.6	2.9	2.4
PCPC II	1.5	1.6	1.6	1.7	1.7	3.0	1.9	1.9	2.7
Radius CDS	2.7	1.1	1.4	1.8	1.9	1.2	1.7	2.1	2.5
SuperMac	1.6	2.5	2.3	2.6	2.4	2.6	2.3	2.6	2.2
T19	1.5	2.0	2.0	1.6	1.8	1.2	1.7	1.7	2.1
TX	1.6	3.2	2.5	3.3	2.7	1.2	2.4	3.5	2.8
Viking 21	3.1	3.6	2.2	4.4	3.5	3.4	3.4	3.9	4.8

Several sample images were used to test editors' subjective impressions of image quality. For each test, editors rated individual monitors on a scale of 1 to 5, with 1 representing the best and 5 the poorest image quality. Each number in the table is the average response in that category. (The T16 monitor is not included because it suffered from a shipping misadjustment.)

the range of 70 to 72 hertz.

The editors that were sensitive to flicker had strong adverse reactions to the monitors with lower vertical refresh rates. As a result, there was a wide disparity in the ratings between monitors with and without high refresh rates. Most editors who were susceptible to flicker eliminated monitors from consideration simply on this basis, even if they rated the monitor high in other areas. This was especially noticeable for the PCPC II, which received the highest overall rating on image quality if the flicker rating is not taken into consideration. Other monitors with poor flicker ratings included the Moniterm, both RasterOps units, and the SuperMac monitor, all of which have low vertical refresh rates. All the monitors from E-Machines had exceptionally stable images, as did the Apple, MegaScreen 2008, and Radius monitors.

Jitter, swim, and drift—if it sounds like a dance that's because it is. If you've ever seen a computer screen where the entire image seemed to be rapidly shaking in one direction or another, you've been subjected to jitter. Jitter occurs when the beam changes position at 1/2-second intervals. The less-noticeable swim and drift

occur when the beam moves at approximate 10-second and 1-minute intervals, respectively. We didn't test for these problems, so when you shop for monitors sit in front of the screen for a while and see if it's trying to dance.

In our tests, we found that most monitors exhibited acceptable levels of ghosting and voltage shrinkage. Ghosting occurs when a rapidly moving image leaves a momentary impression in a pre-

vious location. Voltage shrinkage occurs when the entire screen makes rapid swings between dark and light, so that the entire image momentarily contracts and expands. In practice, voltage shrinkage is nothing more than an annoyance, except with applications such as animation, where objects and backgrounds are constantly changing in real time. All the monitors had slightly detectable voltage shrinkage, but the only monitor with a



Runners Up

The Radius Color Display System (left) and PCPC II (right) were among the best color displays. The Radius monitor produced beautiful images but had a noticeable moiré and only average focus. The PCPC II is the best bet for people who are not sensitive to flicker, because this monitor is comparatively inexpensive and scored the highest overall on image quality.



PAUL FRANZ-MOORE

Medium and Large

The E-Machines T16 (right) is the way to go if you want a bigger screen than the Apple monitor, but you don't want the full size or expense of a 19-inch monitor. The RasterOps 1948S (left) outperformed more accurate monitors when displaying color paint images even though it did not score as well in tracking, purity, and focus tests.

serious voltage shrinkage problem was the RasterOps 1948S.

Even if a screen image does not move, it may bend. When straight lines curve on screen, it is called pincushioning. Most monitors exhibit some minor pincushioning. Serious pincushioning makes it difficult to create accurate line drawings; it distorts the size and shape of objects on screen. This is especially troublesome in graphic design and CAD applications, which require accurate visual feedback. We used a test pattern that displayed a grid of lines with circles superimposed in of the center and corners of the screen. All the monitors were fairly accurate and free from distortion.

RECOMMENDATIONS

It's impossible to make color monitor recommendations without talking about price. Most of these monitor and video board combinations cost between \$5000 and \$7000, making a color monitor one of the most expensive peripheral purchases you are likely to make.

At about \$1650, the Apple 13-inch color monitor may be the only product

most users will be able to consider. You can't see anything but small images on the Apple monitor, but the image quality is excellent. For a little more than twice as much, the E-Machines T16 provides a 60 percent larger image without demanding the desk space of the larger 19-inch monitors. The T16 is an appealing option for users who need increased screen area but just can't justify spending more on the display than they did on the Mac II CPU. If I wanted a color monitor larger than the Apple and I could live without a 19-inch monitor, I'd buy the T16.

The next set of monitors cost about \$5000. Two Hitachi-based monitors, the RasterOps 1948H and the E-Machines C20, provide a full-blown 19-inch display and cost less than any of the Sony Trinitron-based systems of the same size. Of the two, I much prefer the 1948H, which was about \$500 less than the C20 and did a better job of displaying color and gray-scale images. The C20 was flicker free and outperformed the 1948H in the objective tracking test, but this seemed irrelevant considering the monitor's poor focus. Neither monitor is particularly suitable for CAD or word processing applica-

tions. Personally, if I wanted a 19-inch color display I would spend the extra money for one of the top-quality Sony Trinitron-based monitors.

Another alternative in the \$5000 range is the E-Machines TX. The TX provides the detail of a 19-inch monitor in only 16 inches. However, I wouldn't want to look at numbers or text on this monitor for long because of the highly condensed image size. The quality of the TX is very good, and it is an acceptable alternative for applications where maintaining actual size is not important.

The remaining monitors are priced between \$5500 and \$6200. At this price, quality should be the key guide. There's not much to say about the Viking 21. It had the worst image quality of the bunch, and we rated it lowest overall. The SuperMac and RasterOps 1948S are both good monitors, but unlike the very best monitors we examined, each is better suited for some applications than others. The SuperMac is better for CAD and business applications, whereas the RasterOps monitor is better for screen presentations, color illustrations, and scanned gray-scale images.

Of all the 19-inch monitors, four stood above the rest. They produced the most accurate color images and gave an excellent overall performance. The PCPC II had perhaps the best image quality of all, but editors sensitive to flicker simply rejected the PCPC II on the basis of this single criterion. Some editors were swept away by the Radius Color Display System and made it their first choice because of its superlative tracking and gray scale. On the other hand, this unit did not score well on focus, and its high dot density resulted in a shrunken image. It also had a disturbing moiré that occasionally reared its ugly head. The two best monitors were the E-Machines T19 and the MegaScreen 2008. Both monitors had rock solid images and gave top-flight performances in all of our tests. Both are reasonably priced considering their outstanding quality. If you've decided to give up the silver screen, these two color monitors are the brightest stars. **M**

See *Where to Buy* for contact information.

Step-by-step instructions for assembling
three desktop tables

BEST TABLE IN THE HOUSE



BY STEVE MCKINSTRY

Good tables are hard to find. They're even harder to make. We're not talking about the four-legged variety here. It's the row-and-column tables comparing everything from soup to nuts that drive desktop publishers crazy.

Applications that shine at gathering and organizing information generally lack the sophisticated typography, graphics, and color features needed for polished tables. If you transfer data from a spreadsheet or a database to a word processing, page-layout, or graphics program, your neat rows and columns disintegrate into an unwieldy mess. Even if you adjust the ruler tabs to accommodate your columns, changing an entry or pasting in a new line can throw your table back into chaos.

It is possible to create effective tables on the Mac, however. You may have to use

more than one application, but careful planning and care in formatting will result in tables with a professional look.

The secret to keeping your data ducks in a row as you move table information from one application to another is to understand and work with the transfer formats. Spreadsheets store information in cells that are arranged in horizontal rows and vertical columns. Databases arrange information in records subdivided into fields. Word processors and desktop publishing programs create columns using tabs and carriage returns.

All of these formats can be translated into a common language—ASCII, sometimes called text-only format. When saving a document in ASCII format, you are asked to define the delimiters (commas, quotation marks, or tab-and-return mark-

ers, for example) that will separate columns and fields from rows and records. While most applications—including many PC programs—can open ASCII files, keep in mind that font, size, and style attributes will be lost in the translation.

What follows are step-by-step strategies for creating three types of tables. Table Plan 1 will appeal to spreadsheet and/or database users. It shows you a relatively painless method for transferring information from Microsoft Excel and FileMaker II to PageMaker for final presentation. Table Plan 2 shows off Microsoft Word 4.0's ability to create tables within a text document—a one-application solution. And Table Plan 3 illustrates how a table created in Word 4.0 can take advantage of QuarkXPress' advanced typographical and color-separation abilities.

ILLUSTRATIONS BY MICK WIGGINS



TABLE PLAN # 1

The first table plan illustrates how information gathered and organized in spreadsheet and database programs can be formatted and combined with other elements in a page-layout program for final presentation.

There are several advantages to using a spreadsheet like Excel to organize data for a table. You can enter and view information in a straightforward manner; you can insert, delete, and move columns or rows easily; and you have the ability to define complex calculations.

A database like FileMaker II, on the other hand, allows you to view and enter information using a variety of user-defined formats; it can even insert autogenerated serial numbers and the current time and date. Best of all, you can import, search, sort, and export selected information quickly and easily.

Finally, transferring table data into a desktop publishing program like PageMaker 3.0 enables you to refine the formatting, add graphics, and integrate the elements. This is preferable to importing a table created in another application as a PICT image, because with a desktop published table, you can make last-minute changes and maintain type and color control right up until print time.

TOP TEN NUTS FOR 1988

Quarterly Sales in Cans						
Product/No.Cases	Sold:	1st	2nd	3rd	4th	Sales
H. Roast Cashews	179	790	668	561	921	\$16,317
Spanish Peanuts	164	697	562	574	828	\$17,137
Smoked Almonds	140	792	378	467	832	\$8,493
Chopped Walnuts	131	471	400	398	773	\$8,168
Cashews	128	654	456	356	721	\$4,352
Pistachios	106	346	328	459	486	\$5,747
Hazelnuts	93	562	300	432	389	\$3,921
Brazil Nuts	89	236	230	576	262	\$7,237
Macadamia Nuts	84	332	227	304	474	\$6,083
Almonds	67	340	252	135	421	\$3,433
ANNUAL NUT SALES						\$90,888

TABLE PLAN 1 STEP-BY-STEP

1. To begin, I defined several fields in FileMaker and entered data on nut sales for a fictional business, the Soup & Nut Company. Although FileMaker has powerful layout and formatting features, I bypassed them for a simple setup since all these niceties would disappear when I sent the information to another program. Formatting the font, style, color and dimensions in FileMaker slows the process; it's best to apply formats after the table information has solidified (see Figure 1a).

2. At this point, I could have exported information directly to a page-layout program, but I decided to transfer selected product and packaging information from the database to Excel so that I could combine the data with information from an existing spreadsheet and calculate totals.

I chose FileMaker's Output To command under the File menu, named the file, and clicked New. In the subsequent dialog box, I moved fields from the Field List to the Output Order list in the order I wanted to export them. I chose to export the file as Text, with tabs dividing the fields and hard returns dividing records, and I clicked the Formatted button to ensure that the number and date formats would mirror those in the database (see Figure 1b).

3. In Excel, I opened the transferred file and found the data already organized into rows and columns. I then pasted in quarterly sales figures from another Excel file and calculated total unit sales for each product. After moving the Total Cases column, I totaled the annual sales in a new cell using Sum from the Paste Function in the Formula menu.

4. Next, I prepared to transfer the table to PageMaker using Excel's SaveAs command in the File menu. Because I exported using Text format, fields were still divided by tabs with records divided by carriage returns (see Figure 1c).

Additional Tip

In files transferred from Excel formulas appear in quotes. To delete these or to remove hidden tab stops or extra blank rows, you may want to transfer the file to a word processing program that lets you

Code	Division	Product Name	Unit Price	Cases Sold	Salt	NoSalt
1024	Nuts Division	Honey Roasted	5.55	179.17	Yes	No
1028	Nuts Division	Spanish Peanuts	6.44	163.67	Yes	No
1023	Nuts Division	Smoked Almonds	3.44	139.75	Yes	No
1033	Nuts Division	Chopped Walnuts	4.00	130.92	No	Yes
1022	Nuts Division	Cashews	1.99	127.75	Yes	No
1034	Nuts Division	Pistachios	3.55	108.08	Yes	No
1029	Nuts Division	Hazel Nuts	2.33	83.42	Yes	No
1027	Nuts Division	Brazil	5.55	89.00	No	Yes
1025	Nuts Division	Macadamia	4.55	83.75	Yes	No
1020	Nuts Division	Almonds	2.99	67.33	Yes	No

Figure 1a

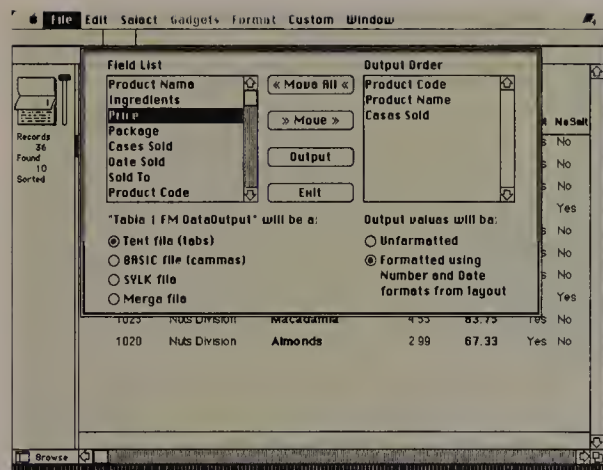


Figure 1b

File Edit Format Data Options Macro Window

TablePlan1

- Table 1 Excel
- Table 1 FM DataOutput
- Table 1 PMTemplate
- Table 1 Set upbook

Save Worksheet as:

Table 1 Excel DataOutput

AST-4000

16188K available

- ☐ Normal
- ☐ SYLK
- ☐ Excel 1.0
- ☒ Text
- ☐ WKS
- ☐ WK1

Save

Print

Cancel

Drive

1989 Annual Nut Sales

	Product	Total Cases	Quarterly Sales in Units				Total
			1st	2nd	3rd	4th	
18	Honey Roasted Cashews	179	790	668	561	921	\$16,317
19	Spanish Peanuts	164	697	562	574	628	\$17,137
20	Smoked Almonds	140	792	378	467	832	\$8,493
21	Chopped Walnuts	131	471	400	398	732	\$8,168
22	Cashews	128	654	456	356	721	\$4,252
23	Pistachios	108	346	328	458	685	\$5,747
24	Hazel Nuts	93	562	300	432	389	\$3,921
25	Brazil	89	236	230	576	262	\$7,287
26	Macadamia	84	332	227	304	474	\$6,083
27	Almonds	67	340	252	135	421	\$3,433
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Figure 1c

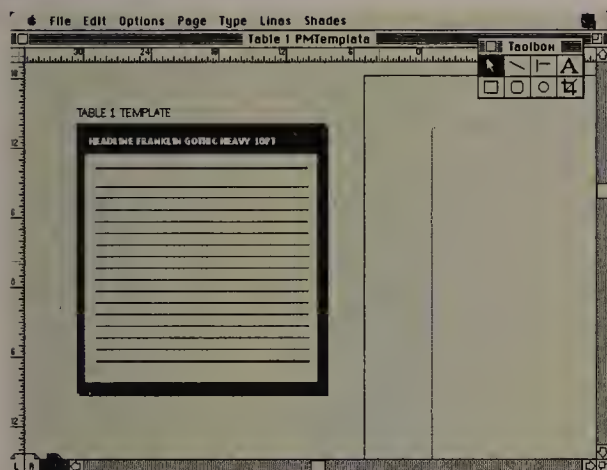


Figure 1d

Product	Total	Quarterly Sales	in Units			
	Cases	1st	2nd	3rd	4th	Total
189 Honey Roasted Cashews	179	790	668	561	531	\$18,317
190 Spanish Peanuts	164	697	562	574	420	\$17,137
200 Smoked Almonds	140	792	378	467	452	\$8,493
210 Chopped Walnuts	131	471	400	388	773	\$8,168
220 Cashews	128	654	456	356	721	\$4,252
230 Pistachios	108	346	328	458	468	\$5,747
240 Hazel Nuts	93	562	300	432	369	\$3,921
250 Brazil	89	236	220	576	262	\$7,287
260 Macadamia	84	332	227	304	474	\$6,083
270 Almonds	67	340	252	135	421	\$3,433
Total						\$92,051

Figure 1e

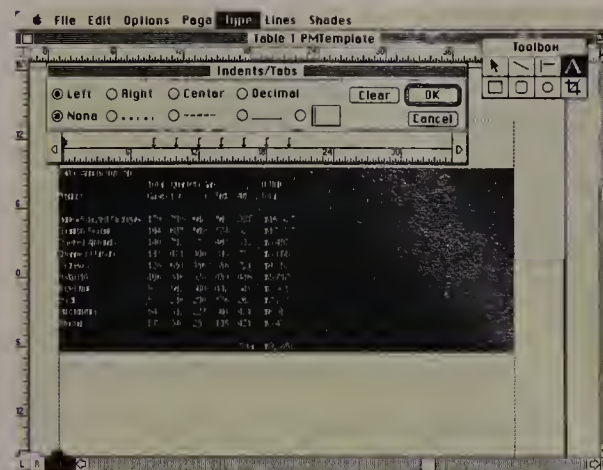


Figure 1f

see invisible paragraph markings. Delete the unnecessary items using the Find and Change option.

5. In PageMaker, I created a template for the table in order to speed up production and to maintain a consistent design style for subsequent tables. This template defined elements such as borders, screen tints, and reverse bars and rules. (I look forward to being able to create a template in Adobe Illustrator and import it as an encapsulated PostScript [EPS] file, complete with CMYK [cyan, magenta, yellow, and black] color information for separations using PageMaker's soon-to-be-released Color Extensions.) I then stored the template on the pasteboard outside the page area so that I could copy and paste the template into position as needed (see Figure 1d).

6. In PageMaker, I chose the Place command from the File menu and selected the file prepared in Step 4. The information looked disorganized because no tabs had been set for column separation. Also, the text defaulted to the font and size last set in PageMaker.

Using the Define Styles command under the Text menu, I was able to name

The screenshot shows a spreadsheet application window titled 'Table 1 PMTemplate'. The menu bar includes 'File', 'Edit', 'Options', 'Page', 'Type', 'Lines', and 'Shades'. A 'Toolbox' is visible on the right. A 'Type specifications' dialog box is open, displaying settings for text formatting. The dialog includes fields for 'Font' (H Franklin Gothic Heavy), 'Size' (8 points), 'Case' (Normal), and 'Position' (Normal). It also has checkboxes for 'Type style' options: Bold, Italic, Underline, Shadow, Outline, Strikethru, and Reverse. A 'Style' dropdown menu is open, showing options: 'T1 Body/Txt', 'T1 Head', 'T1 Source', 'T1 SubHeads', and 'T1 Total'. The background spreadsheet shows a table with columns for product names, quantities, and prices.

Product	Total	Quarterly Sales	in Units	Total	
	Cases	1st	2nd	3rd	4th
18 Honey Roasted Cashews	179	790	668	561	\$21,317
19 Spanish Peanuts	164	697	562	574	\$17,137
20 Smoked Almonds	140	792	378	467	\$8,493
21 Chopped Walnuts	131	471	400	388	\$8,168
22 Cashews	128	654	456	356	\$4,252
23 Pistachios	108	346	328	458	\$5,747
24 Hazel Nuts	93	562	300	432	\$3,921
25 Brazil	89	236	230	576	\$7,287
26 Macadamia	84	332	227	304	\$6,083
27 Almonds	67	340	252	135	\$3,433
Total					\$92,051

Figure 1g

individual styles for various elements in the table—Head, BodyTxt, Total, and so forth—and assign them Type, Paragraph, Tab, and Color attributes. I then applied the styles to the appropriate table elements (see Figure 1e).

7. To adjust the columns of type, I selected all the text and used PageMaker's Indents/Tabs function under the Type menu. I positioned the tab ruler at the start of the first column of type, cleared all existing tab stops, and added new ones. Right, left, centered, and decimal tabs can be set for the alignment of each column. I spaced the tabs roughly where the column breaks were most likely to fall and

clicked OK to see how the columns were lining up (see Figure 1f).

8. After dragging the table template from the pasteboard onto the active page, I adjusted the leading between rows of type for a proper fit using the Type specifications dialog box. You can define leading in the style sheet or between selected rows. This is helpful when adding graphic elements, such as rulers or bars, for definition (See Figure 1g).

Additional Tip

Because both PageMaker and Word apply styles to all text between two hard returns, whenever you tag a table row with a style, all the type in it changes. To assign a style to a column or cell you must apply changes individually, attribute by attribute.

9. To make final adjustments to the columns, I used the tab rulers and put in a decimal tab setting to align dollar amounts flush right.

10. Finally, for better definition between rows and columns, I added the remaining graphic elements—rules, bars, and screens. You can adjust the depth of the template by dragging template elements to the proper position (see Table 1).



TABLE PLAN # 2

Microsoft Word 4.0 offers special table-creation tools that enable you to create and display tables from within one program. You can organize information in columns, rows, and cells—just as in a spreadsheet—but you maintain advanced formatting controls over type. You can even wrap text automatically within a cell, and the entire row adjusts to the new cell depth. You also have access to search and replace functions, and you can check spelling and use style sheets. Word 4.0 includes a new hot link feature that lets you access information in other programs such as Excel, MacPaint, and MacDraw. Word 4.0 ships with a special version of SuperPaint 1.1 and lets you quickly update graphics originally created in SuperPaint.

While Word 4.0 can sort data alphabetically and numerically, and it does have limited calculation controls, you should not expect Word 4.0 to perform the file-management tasks best left to databases and spreadsheets. Also, Word 4.0's formatting features may not be sophisticated enough for all publishing needs. Compared with desktop publishing programs, Word 4.0 offers limited tools for adjusting line weights, screens, reverses, color, and graphics.

LITTLE-KNOWN FACTS ABOUT NUTS				PREPARED BY THE SOUP & NUT COMPANY							
NUT	PACKED	DESCRIPTION	ST	HR	DR	SM	MX	SH	SK		
Almonds		Chiefly grown in California. Large trees are related to the peach and produce a fruit (drupe) that surrounds the nut (stone). The edible portion (kernel) is rich in oil, used in baking.	✓					✓	✓		
Brazil Nuts		Native to the Amazon jungles of Brazil. Large trees up to 150 feet tall produce a hard-shelled woody fruit that contains from 12-25 nuts. Nuts have a hard outer shell.	✓		✓			✓			
Cashews		Native to Central America, small trees and bushes that produce a cashew "apple" with the seeds (nut) inside. Both can be eaten. The tree is related to poison ivy, but the poison is removed from the nut during roasting.	✓		✓			✓			
Chopped Walnuts		Chopped fine, ready for baking. The English walnut is harvested in California and Oregon for its valuable nut. The nut is hard-shelled and deeply grooved.			✓			✓			
Hazelnuts		Native to America and Europe. Also called filberts, nuts are clustered on small trees. A burr surrounds the nut during growing, but is lost after the first frost to reveal a smooth brown shell.						✓	✓		
Honey Roasted Cashews		Premium cashews roasted in a light golden honey glaze.	✓	✓				✓			
Macadamia Nuts		The Macadamia tree is native to Australia, but has been commercially cultivated in Hawaii. A large, smooth seed, rich in oil, with a sweet flavor.	✓					✓			
Pistachios		Native to Mediterranean region, every tree is either male or female and requires the opposite sex nearby for pollination. Nuts grow in tight clusters. Seeds are smooth and shiny and tend to open at the ends.			✓				✓		
Smoked Almonds		Premium whole almonds with hickory-smoked flavor.	✓			✓		✓			
Spanish Peanuts		The peanut is native to the Americas and is harvested chiefly in southern states. Peanuts grow below ground at the root end of small peanut plants and produce more oil per pound than any other crop.	✓		✓			✓	✓		
ST = SALT, HR = HONEY ROASTED, DR = DRY ROASTED, SM = SMOKED, MX = MIXED, SH = SHELLED, SK = SKINS											✓ = YES
Source: SOUP & NUT COMPANY. Information for Soupy (version 1.0).											

TABLE PLAN 2 STEP-BY-STEP

1. I began organizing my Word 4.0 table by opening a new document and choosing Show Ruler from the Format menu. Then, using Preferences in the Edit menu, I selected Show Table in order to see grid lines and I chose Picas as the measurement standard. To see the black dots that signify the end of each cell, I turned on the Show ¶ feature under the Edit menu (see Figure 2a).

2. Next, under the Document menu, I chose Insert Table, which brings up a dialog box for setting the number of rows and columns as well as the column width for the table (see Figure 2b).

3. I could have imported my data from any ASCII file with delimiters by opening the text file, highlighting the appropriate text, and choosing Insert Table. I would then have chosen the number of rows and columns and made sure that the Tab Delimited button was on.

In actuality, I chose to type my data directly into each cell, moving from cell to cell with tab or arrow keys. When text wraps within a cell, the entire row automatically adjusts to accommodate the new cell depth. A cell can hold any number of paragraphs (see Figure 2c).

4. To move the Description column, I first chose Table under the Edit menu and created a new column in the proper position. Then I selected the entire column and cut it—the column remained, but the text disappeared. I then pasted the descriptions to the newly created column and deleted the now empty column (see Figure 2d). You can follow the same procedure to add, delete, and move entire rows, as well.

5. To adjust the width of the Description column, I clicked the Ruler Scale Icon to the far right of the ruler. This changed the ruler to a table scale showing small T markings above each column divider (see Figure 2e). I then dragged the markers to a new position to adjust the column width. Unlike in spreadsheets, cell widths in Word can be changed individually.

6. When I applied style sheets in Table Plan 1, changes affected all the text between hard carriage returns—usually everything in a single row. With Word 4.0,

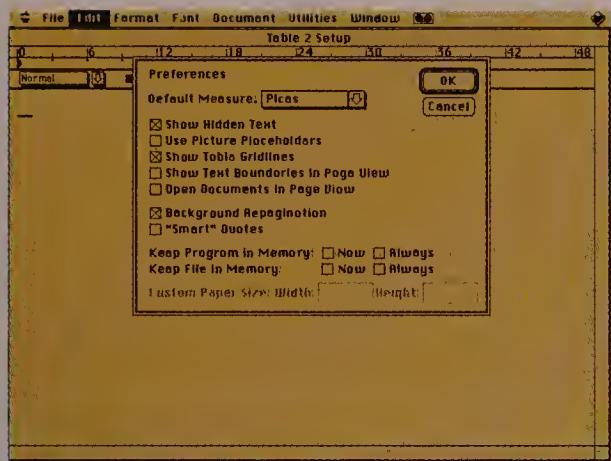


Figure 2a

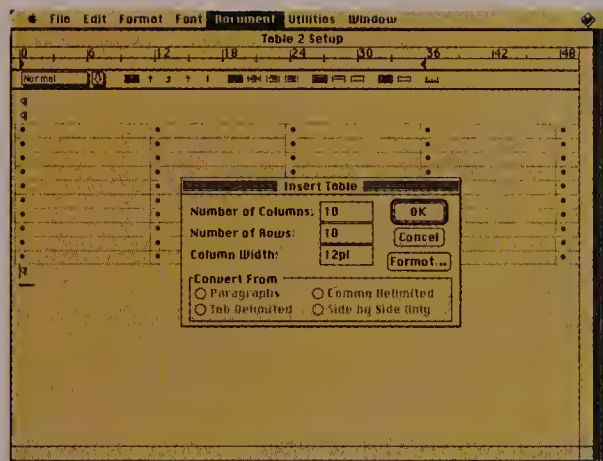


Figure 2b

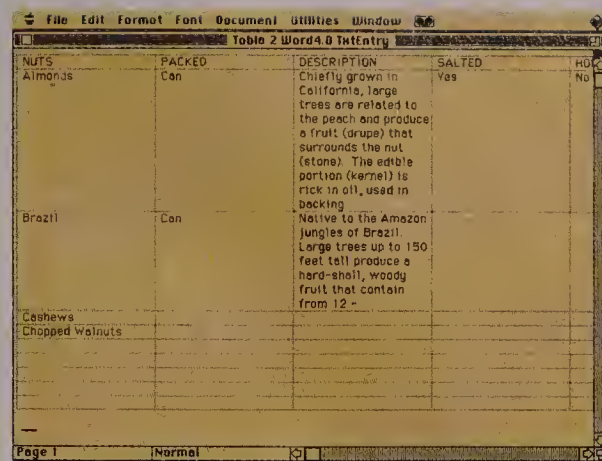


Figure 2c

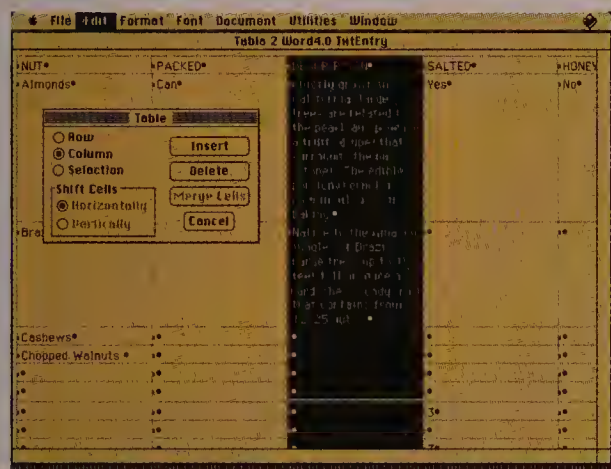


Figure 2d

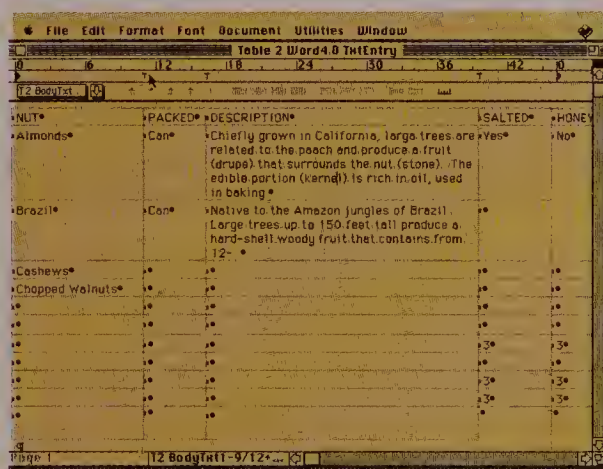


Figure 2e

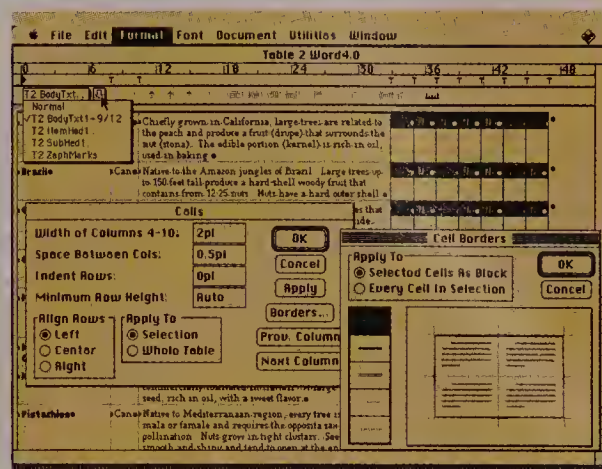


Figure 2f

I could apply styles to single cells or to sets of cells without affecting adjoining cells.

I could have controlled border treatments and position placement by style sheets, but instead I used the Cells command under the Format menu to adjust the look of my table. The Cells dialog box is similar to the Insert Table box, and its options let you reset column width, the space between rows, and row height and alignment. The Borders button brings up its own dialog box with Word 4.0's limited line and placement choices (see Figure 2f).

7. To refine the columns that describe the nut processing methods, I used the Change command under the Utilities menu to delete the word *No*. Next, I typed *Yes* in the Find What box and the number 3 (the Zapf Dingbat keyboard equivalent for a check mark) in the Change To box. I then applied a style for Zapf Dingbats to these cells.

8. I would have liked to make slanting column heads in order to fit in a full word processing method. But Word 4.0 cannot rotate type to an angle, so I created a two-letter code for each one. Then I wanted to

add a legend explaining the codes, so I inserted an extra row at the top of the table and merged the cells into a single cell using the Table command under the Edit menu (see Figure 2g).

9. After typing the legends, I cut and pasted the merged row at the base of the table. I created another merged row at the top and typed in the title information.

10. To replace the packaging information in the second column with small icons representing cans, bags, and jars, I again used the Change command. The icons had already been created in SuperPaint and saved in the Scrapbook. I copied the icons one at a time to the Clipboard and used the Change All command to replace the text in the table with its graphic equivalent by using ^c to signify the Clipboard image (see Figure 2h).

Additional Tip

Images created in SuperPaint can be quickly updated using Word 4.0's Edit Link command.

11. Finally, after tweaking the column spacing for width and the leading for depth, I turned the paragraph marks and

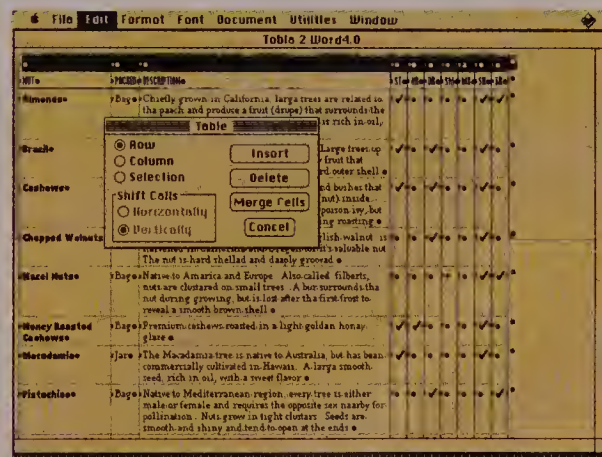


Figure 2g

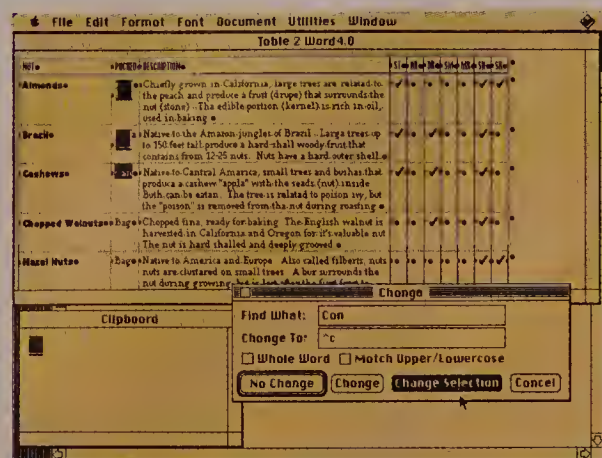


Figure 2h

table grid lines off to see how the table would look when printed (see Table 2).



TABLE PLAN # 3

There are several reasons why you might choose to organize the information for a table using Word 4.0. Word processors are familiar to most Mac users, and many tables don't need the sophisticated sorting and calculating tools found in databases and spreadsheets. Inputting and revising data are quite simple with Word 4.0, and style formatting information stays intact when you transfer a file to a desktop publishing package for final formatting.

Because Word's design and graphics tools are too limited for producing some tables, it makes sense to combine Word 4.0 with a professional desktop publishing program like QuarkXPress. For this table I chose XPress because it includes text-organization tools that enable you to show paragraph markings and to search and replace text attributes. Also, XPress offers professional control over type and color, and you can send the page geometry directly to large prepress systems such as Scitex.

TABLE PLAN 3 STEP-BY-STEP

1. After using Word 4.0 to organize my information, I carefully edited the table and created style sheets for the rows and columns. I waited to format graphic elements such as borders, position, or dingbats, however, until I transferred the table to XPress (see Figure 3a).

2. Next, I selected the entire table and opened Table to Text, from the Document menu. I chose the Tab Delimited option to create a file with tabs separating column elements and carriage returns dividing rows (see Figure 3b).

3. Because Word 4.0's special formatting is lost when transferred to QuarkXPress, I saved the file in Word 3.0 format. Note that individual cell and column formatting is lost, and lines no longer wrap (see Figure 3c).

4. Because XPress has no pasteboard, I had to be sure to give myself elbow room by creating extra workspace for the table. The working area shown in Figure 3d measured 16 by 16 inches. If a table incorporates a large graphic, it is important to size the graphic before you insert it into the table. I created a parent text box inside the workspace, located the text file from Word 4.0, and used Place to import the file into the text box. Choosing Show Invisibles let me see where paragraph marks would fall, and I stretched the text frame width until rows of text no longer wrapped.

5. When you create a style sheet in XPress, you can apply many typographical effects such as kerning, horizontal scaling, and CMYK color separations. I used XPress' Find/Change feature to change the word Yes in Franklin Gothic font to a check mark—the number 3 key in Zapf Dingbats (see Figure 3e). To assign color, you need to select and change check marks individually.

6. In XPress, setting tabs for the columns requires that you distinguish between columns that will wrap and those that won't. Text that will wrap must be cut and pasted into a columnar format, so you must first determine rough tab settings for the various columns. In this case, the first two columns will be wider and they will contain text that wraps, so I set tabs for

BEST RATED SOUPS													
It was a good year for exotic soups at the Soup & Nut Company. Often our consumers ask, "What's in that soup anyway?" Below is a list of main ingredients and a rating consumers gave our soups in a recent survey. To the right is an additional breakdown of popular uses.				SAUCES	BROTH	SEDATIVE	PROGRAMMING	DIETING	FISHING	BUILDING	CULT WORSHIP	REVENGE	
SOUP	MAIN INGREDIENT												
ASCII ALPHABET SOUP	Have a bad code? Use your noodles to program tabs, returns, and other favorites.	   											
BONE SOUP	Large bone, water.												
CAJUN FRENCH UNYON SOUP	Mississippi river bottom, blackened Mardi Gras confetti.	 											
CHICKEN JUMBO JUMBO GUMBO	Sacrificial chicken & Voodoo incantations.	 											
GRISTLE & BITS	Unspecified beef parts & bone chips.												
LETHAL LIMA BEAN	Plastic explosives in lima bean shapes. Remote control cooking recommended.												
MEDITATION MUSHROOM	Mushrooms with mild euphoria.	 											
RAINBOWSTONE	Live minnows in hot pond water.												
PRAIRIE CHICKEN BROTH	Small fowl adrift in sage brush sprouts.												
SEA CUCUMBER CHOWDER	Sea cucumber & kelp noodles.	 											
TRIPE & BEANS	Big chunks of tripe.												
OUT OF SEASON VEGETABLE	Limp lettuce, bruised tomatoes, waxy carrots.	 											
RATINGS KEY:		TASTY	  	EDIBLE	 	TOXIC							
Source: SOUP & NUT COMPANY information for display purposes only													

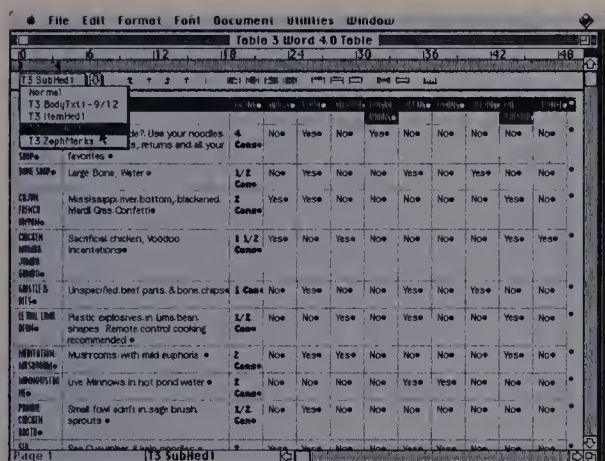


Figure 3a

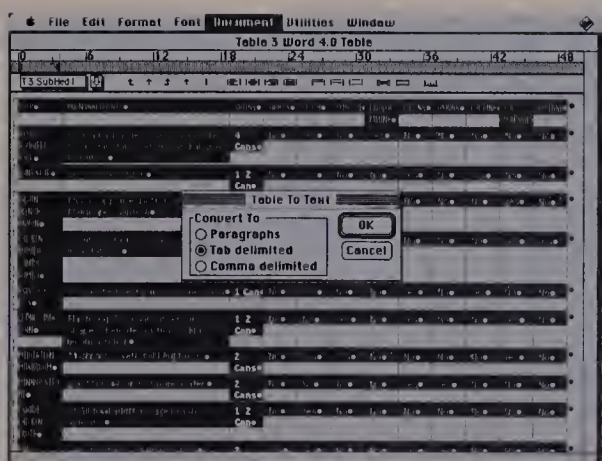


Figure 3b

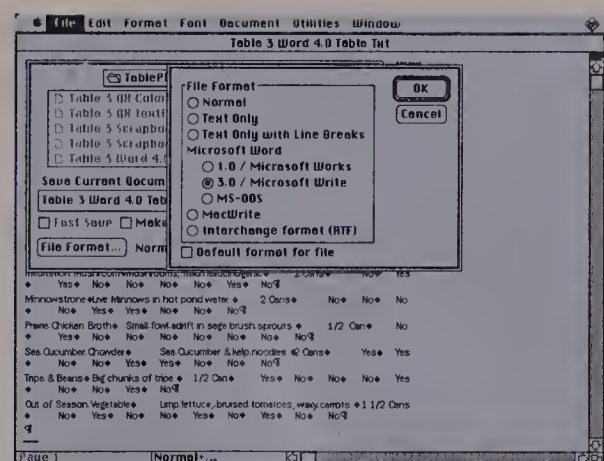


Figure 3c

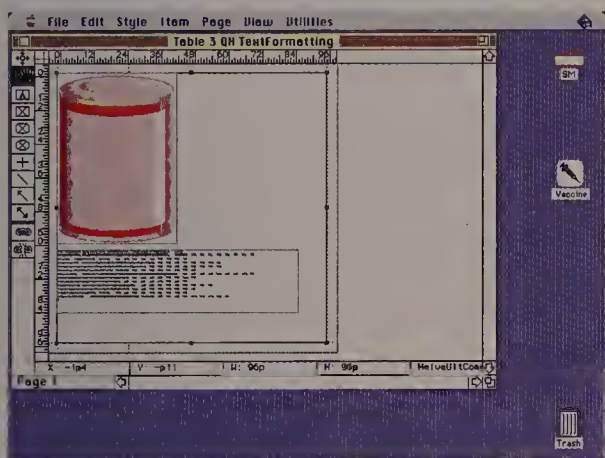


Figure 3d

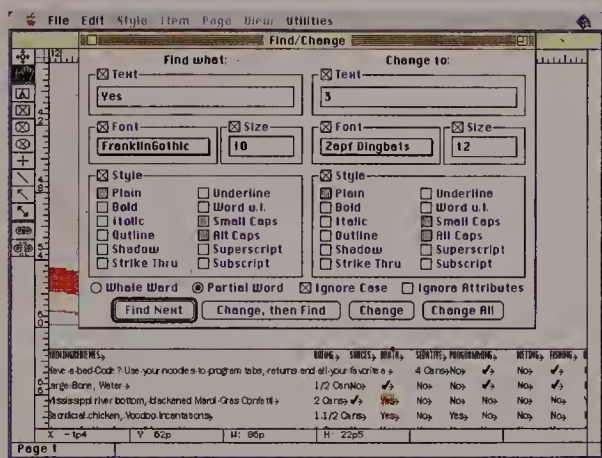


Figure 3e

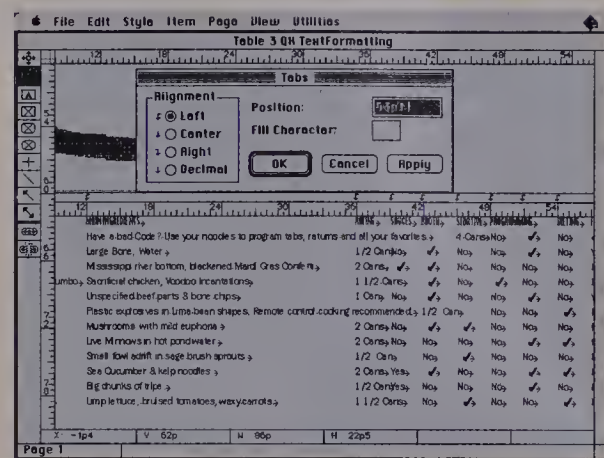


Figure 3f

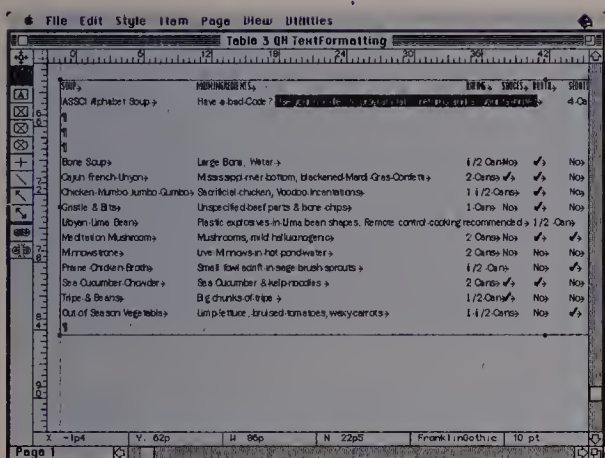


Figure 3g

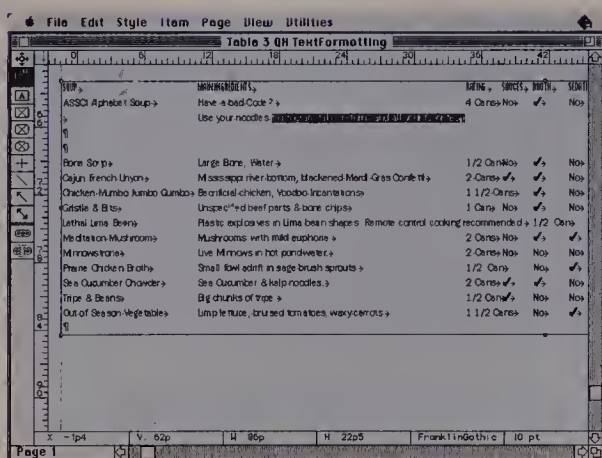


Figure 3h

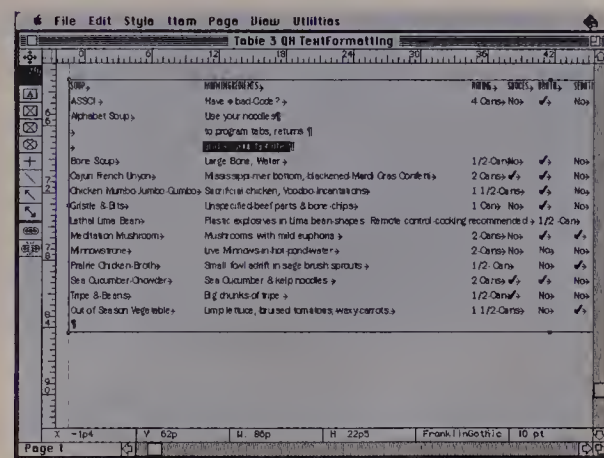


Figure 3i

these columns that allowed text to temporarily extend into subsequent columns.

I then formatted final tabs for the narrowest columns—those, like the Yes and No columns, that wouldn't need to wrap (see Figure 3f).

Additional Tip

Both PageMaker and XPress have a limit of 20 tab stops, which allows for 21 columns. Larger tables with more columns need to be built in two parts. To do this, make two copies of the file in Excel or Word 4.0, delete the second half from one and the first half from the other. If you're working in Excel, save the docu-

ment as text first so that text entered as numbers won't recalculate when you delete columns.

7. Lines of text that wrap prove to be the most difficult problem in formatting a table like this one. Because each wrap requires a new row, I added extra hard returns below each row that would contain wrapped text when I set columns to a narrower measure (see Figure 3g).

Starting with the longest line of text in a row, I highlighted and cut the portion of text that extended beyond the point where I wanted the column to end. I was careful not to cut the tab stops at the end of the line (see Figure 3h).

In the next row created by one of the hard returns, I tabbed over to the appropriate column and pasted the cut segment. If the second line of text was still too long, I repeated the process on subsequent lines until all the text appeared in the column (see Figure 3i).

8. I then readjusted the Tab settings and edited the text as needed to fit. I applied style sheets for text in individual cells. As in Table 1, text that required a format unlike the row style had to be selected individually and changed attribute by attribute (see Figure 3j).

If you need to make major content revisions that will dramatically change rows

TABLE EDITORS TO THE RESCUE

Tables can be troublesome to create, but the authority and visual impact they add to a document or presentation make the effort worth it. Two products that promise to take some of the drudgery out of table making—TableTools from Mansfield Systems and Tycha from Macreations—should be on the shelves by the time you read this.

TableTools offers an environment optimized for the creation of comparison and catalog tables. The program's most unique feature is its Fram Within Shuttle. While under either Multi-Finder or the Finder, you can shuttle back and forth between TableTools and MacDraw, Adobe Illustrator, MacPaint, FullPaint, or Cricket Graph; and you can edit data or graphics created in those applications. Linked to Excel, TableTools can compute numerical data in its own documents, preserving all Excel formulas and number formatting.

Like a page in a document, each cell can contain wrapping text, paragraphs, and graphics. You can position elements anywhere in a cell, and there are tab and leading tools to facilitate text formatting. Because discontinuous text selection is possible, font, size, and styles can be changed in multiple locations at once. You can dress up your tables with a variety of border styles, diagonal lines, fill shades, and patterns. Tables can be as large as 128 columns by 512 rows, and there are 254 text style sheets and 254 style sheets for each of the table dimensions—rows, columns, and cells. Finally,

you can print your new table as is, or you can incorporate it into a page-layout document. TableTools will sell for \$395.

Tycha is also designed to facilitate the creation of desktop published tables. Besides offering excellent control over borders, grids, and shading, Tycha lets you create tables of any size; and it includes full 256-color support, complete with the ability to load and save palettes from other programs. It's easy to create angled column headings, and footnotes appear automatically at the end of the table. In addition, you have access to 256 built-in dingbats. The Settings option lets you define type styles globally or for any individual type element within a cell, and you can load and save table styles.

Table information can be imported from any SYLK or comma-delimited text file, and MacPaint and PICT images can be embedded as graphics. Like Excel, Tycha lets you insert and delete columns and rows and provides Fill Down and Fill Right features. A Swap option lets you switch two adjacent table elements. While the program does not have hot links to other applications, you can export table information to other programs for editing, using SYLK, tabbed text, or comma-delimited formats. You can also save a table as a MacPaint, PICT, or proprietary Tycha file. To allow anyone to look at Tycho files, Tycha Table Viewer will be distributed free as public domain software. Tycho will retail for \$99.95.

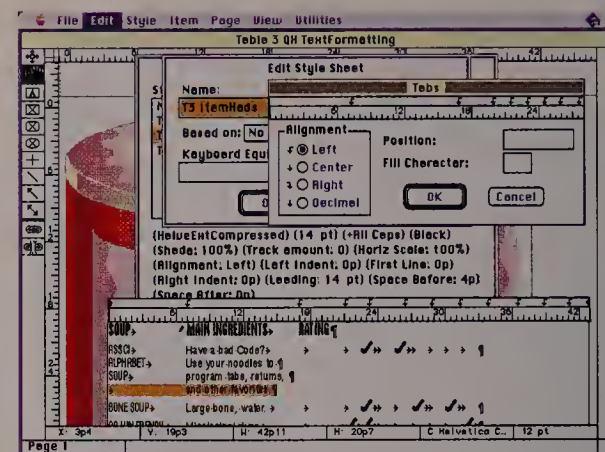


Figure 3j

and columns at this stage, it is easier to transfer the text back to Word 4.0 and edit it as a table. To do so, highlight the text in XPress and use Save Text in the File menu to save it in Microsoft Word 3.0 format. Open the file in Word, highlight the text, choose Insert Table from the Document menu and convert to tab-delimited format. After editing, transfer the file back to XPress as outlined in steps 2 and 3. Because XPress retains some formatting, such as row styles and tab stops, you won't need to reset these elements.

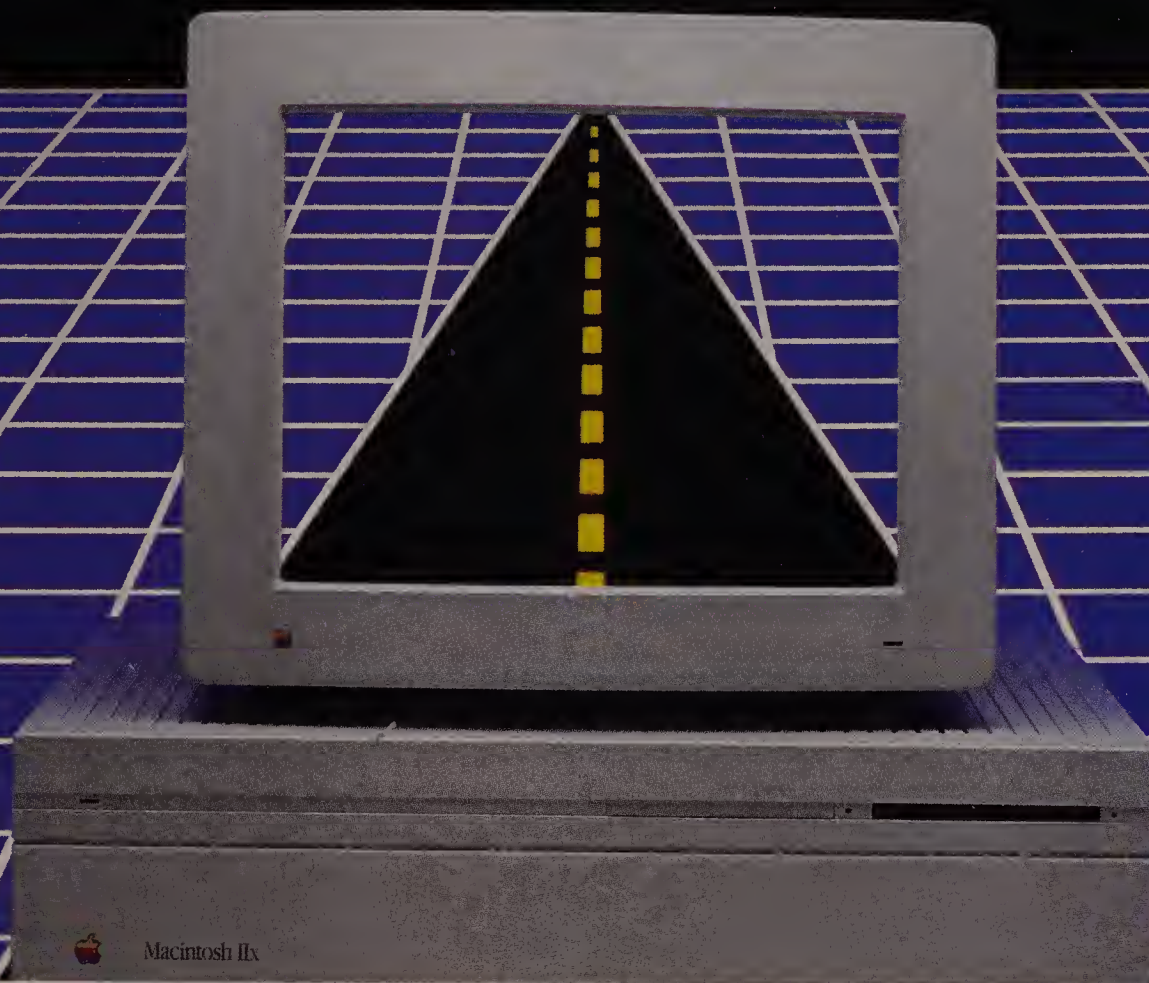
9. Finally, after placing the graphic elements in position, I applied XPress' CMYK color percentages to the text and combined it with four-color graphics created in Illustrator 88 and FreeHand (see Table 3). Since XPress doesn't rotate type, I had to rotate some table headings in Illustrator 88 and import them. All graphic treatments, such as the rules, the large soup can in the background, and the small can icons were handled with XPress tools, FreeHand, or Illustrator 88 files. The finished table was separated with the rest of the page direct to four-color film on a Linotronic typesetter. ■

See *Where to Buy* for contact information.

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Steve McKinstry, who lives in Anacortes, Washington, with an office in San Francisco, is a consultant and designer specializing in converting publications to desktop. His award-winning illustrations have appeared in Communications Arts, Print, and Society of Newspaper Design Annuals. He also created, as cover art for U.S. News and World Report, the first artwork produced entirely on the Mac for a national news magazine.

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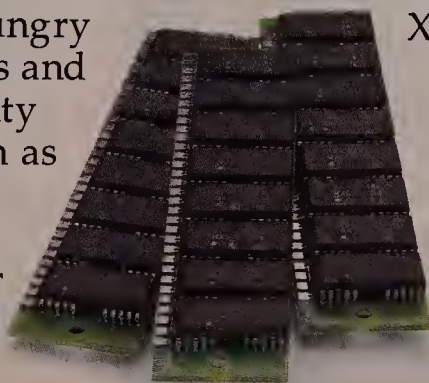
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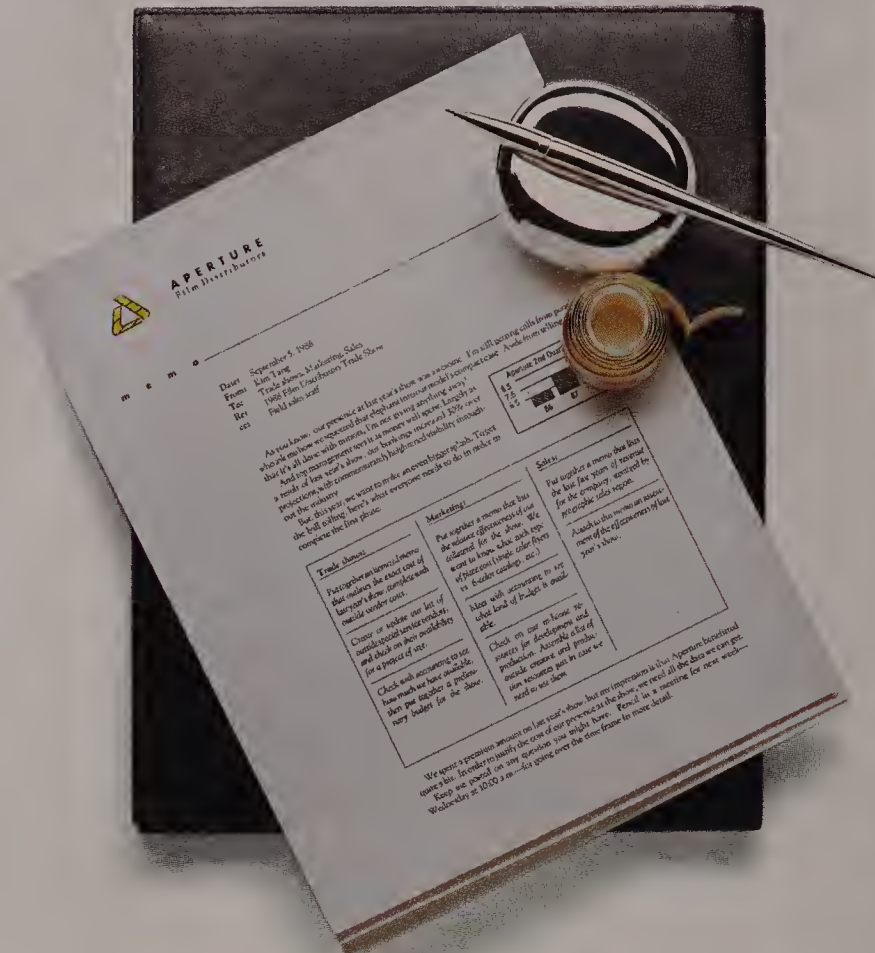
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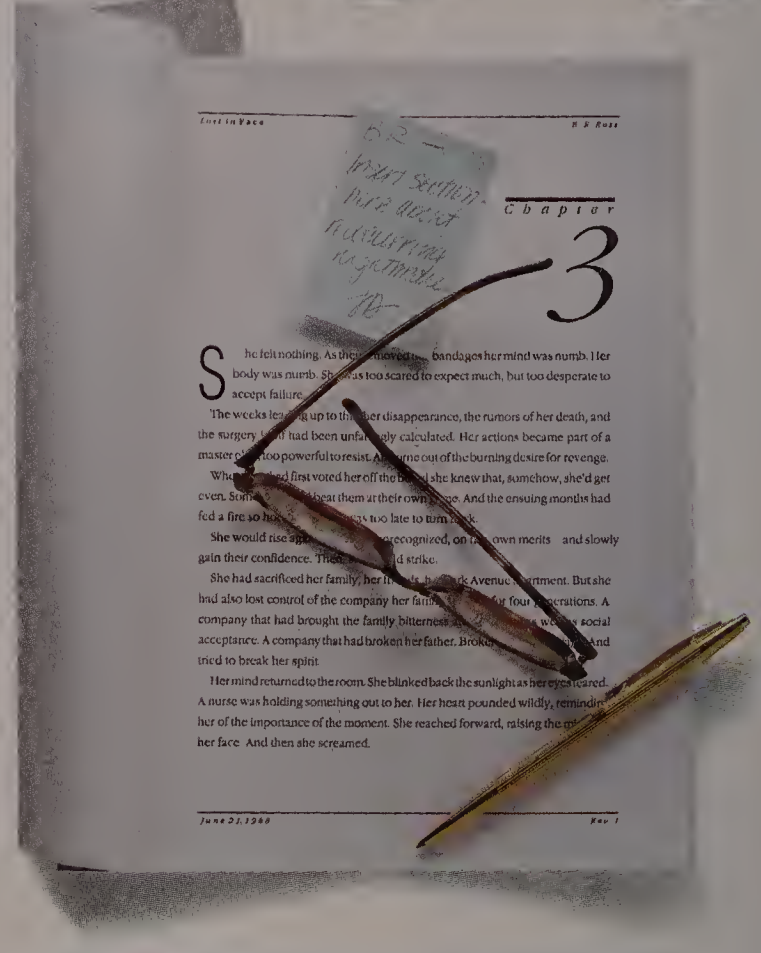
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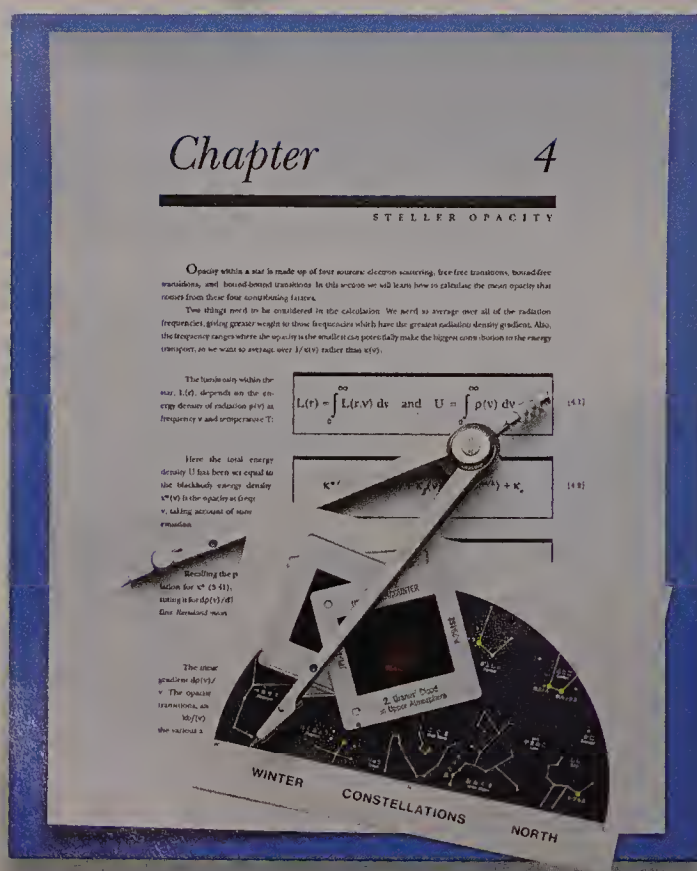
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REVIEWS



SUPERPAINT 2.0

Paint/Draw Program

Pros: Incorporates bitmapped and object-oriented drawing tools; numerous features added since original release. **Cons:** Added features make program harder to learn. **Company:** Silicon Beach Software. **Requires:** Mac Plus. **List price:** \$199.



Don't let the modest 2.0 appended to its name fool you: SuperPaint has been substantially revitalized. Silicon Beach wasn't content to merely give the oldster a facelift, but added enough muscle to keep SuperPaint a major player in the Mac graphics game.

If you have never worked with SuperPaint, a basic description is in order. Before SuperPaint came on the scene, Mac drawing programs were divided into two camps: bitmapped graphics (like MacPaint) and object-oriented graphics (like MacDraw). SuperPaint offers the best of both worlds: bitmapped drawing tools in one layer and object-oriented tools in another. The two transparent layers overlap, allowing you to work in the paint layer while viewing the drawing layer or vice versa. You switch from one layer to another by clicking on an icon, and you can easily transport elements of a drawing from one layer to another.

The new version offers the same setup, with yet another illustration technique added to the draw layer: bezier curves like those found in FreeHand or Illustrator 88. With SuperPaint's new Freehand Bezier tool, you draw a line or shape as you would with the standard pencil tool. The result isn't a static line, however, but a path made up of control points and handles that enable you to fine-tune your

drawing. SuperPaint 2.0 features two types of control points, hinge points for corners and smooth points for curves. As in PostScript drawing programs, you can add or delete points, drag a point or its handles to reshape a path, or snip a path into separate segments.

Your Trace or Mine?

Transforming your shaky freehand lines into smooth bezier curves is great, but SuperPaint 2.0 doesn't stop there. Feed the program a bitmapped image and it will redraw the image for you. The new AutoTrace command converts a bitmapped graphic in the paint layer into paths made up of polygons or bezier curves that appear in the draw layer. These paths can be edited just like beziers or polygons you draw from scratch. AutoTrace does a fine job of tracing shapes and lets you adjust tracing precision, but I found SuperPaint's autotraced shapes harder to edit than those autotraced in FreeHand.

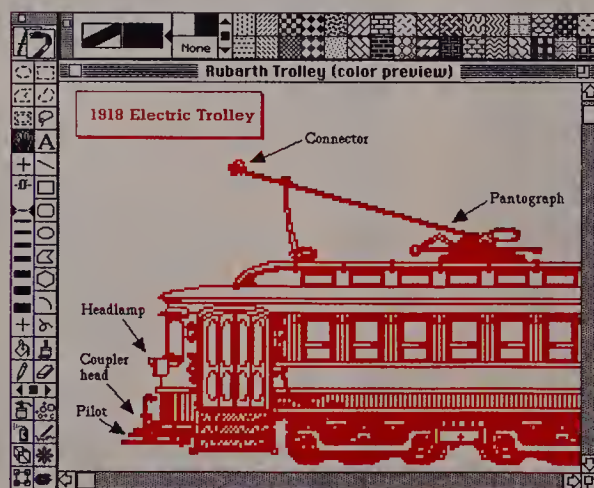
While AutoTrace is the most spectacular of SuperPaint's new features, several

less glamorous but more practical features will be appreciated by many artists. My biggest disappointment with the original version was its inability to mix type styles in a block of text. The new version rectifies this flaw, allowing you to mix fonts, sizes, and styles at will. You can also rotate and scale text in the draw layer, options lacking in the earlier version.

Another of my favorite 2.0 enhancements is the ability to draw in landscape mode, a horizontal rather than a vertical layout. Now you can create an illustration in landscape mode, rather than going through the cumbersome process of rotating an image and printing it in the landscape orientation.

Other improvements include a grabber tool to move an image around the screen, a Multigon tool to create various regular polygons, separate controls for vertical and horizontal scaling, a hairline line width, and a blended fill option. (Oddly enough, the blended fill can be applied from top to bottom, diagonally, and radially, but not horizontally. And while I'm picking nits, a hairline is a nice addition, but I'd like to see adjustable line widths, rather than just the program's default widths.) While the original SuperPaint offered only a one-size, one-density spray can, the new version features an adjustable airbrush, de rigueur in any modern paint program. And those who use SuperPaint for diagrams, flowcharts, and technical drawings will appreciate the addition of editable arrowheads and dashed lines.

The current version also adds two new paint modes, which affect the way the white and black portions of a drawing interact. Like the original release, SuperPaint 2.0 features Paint on Black, in which the current paint pattern appears only on black portions of an existing



Plug 'Em In

SuperPaint 2.0 offers a unique feature called plug-in modules. The set of tools at the bottom of the paint palette can be added, deleted, or rearranged at will. New tools can be added to the program as they become available.



The figure with a fan was created in the paint layer and then copied to the draw layer where it was colored with object fills. The other elements are draw objects. While SuperPaint supports only the eight original QuickDraw colors (those available on an ImageWriter II), achieving a far wider range of colors is possible by choosing patterns and by assigning different foreground and background colors to those patterns.

drawing. The new Invert mode reverses the white and black portions of a drawing against a black background, while the Transparent mode lets the background show through white areas.

Version 2.0 offers not only new tools and painting modes, but new options for selecting an area of a drawing. In addition to the standard selection rectangle and lasso, SuperPaint 2.0 provides an oval-shaped selection tool, a polygon selection tool, a freehand selection tool, and a freeform selector that includes the surrounding background rather than shrinking around a selection the way the lasso does. (I found little use for the oval selector, but I suppose a little variety doesn't hurt.)

Plug In, Click On, Try Out

SuperPaint 2.0 presents an innovation called *plug-in modules*, custom tools or commands that you can add to the program. The program comes with 22 plug-in tools; Silicon Beach is soliciting additional tools from the Mac programming community (see "Plug 'Em In"). Although you have to be a programmer to create custom tools or commands, anyone with the brains of a sea slug can install custom tools simply by dragging them into a

folder. The tools that come with the program range from the whimsical (a cloud that spatters raindrops, a whirling cyclone that scatters pixels) to the indispensable (an adjustable airbrush, a calligraphy pen, a water droplet for blurring edges).

SuperPaint 2.0 ventures into the world of color, but not very far. You can assign colors from a palette of 8 hues, either the standard System colors or a set of ImageWriter II colors. You can preview your colors if you have a color Mac II, but you don't need to have a color monitor to assign colors. Colors can be assigned to multiple objects in the draw layer, and the 8 basic colors can be combined as foreground and background colors for additional hues. An illustration in the paint layer, on the other hand, can only be "colorized" with a single color that affects all black pixels. SuperPaint's color is a plus, but it's disappointing if you're used to the 256 colors available in a color paint program.

SuperPaint's multitude of new features do not slow its performance. The tools perform smoothly and quickly, and I didn't run into any of the bugs or glitches one often finds in new releases. My drawings printed without a hitch; paint and draw objects that lined up on screen lined up on the printed page as well.

Painting the Blues

SuperPaint 2.0 is better than its predecessor, but it's also bigger. While version 1.0 took up only 160K, the new version occupies 500K. This added bulk is no big deal in the Age of Hard Disks, but perhaps a few tools could have been trimmed away; for example, I see no need for keeping the original spray can around with the spiffy new airbrush on hand.

And although most of the new features are essential enhancements, the addition of so many new tools and commands undermines a major component of the original SuperPaint's appeal: the fact that its lean, clean interface made the program extremely easy to learn. The current version has a 400-page manual that, although competently written, is somewhat daunting by virtue of its bulk. On the whole, however, the program is still a shining example of a good user interface.

If you're familiar with the earlier version, you may be momentarily discomfited when you find that a few familiar keystroke shortcuts are different in version 2.0. For example, I was dismayed to press the familiar ⌘-E, which used to transfer a selection from one layer to the other, to find myself zooming in on the drawing in the new version. I also missed a few other keyboard shortcuts I'd grown accustomed to using—the Nudge commands, which move a selection up, down, or sideways in 1-pixel increments, are now inconveniently located in a submenu, as are the shortcuts for assigning text styles.

Complaints aside, however, I think Silicon Beach has done a wonderful job of souping up SuperPaint. It's always been my favorite general-purpose graphics program, and continues to have a place in my heart and on my hard disk. I like the program's seamless integration of bit-mapped and object-oriented drawing tools and its friendly interface. Granted, it doesn't fill all my graphics needs—I still use PixelPaint or Studio/8 for color paint work and FreeHand for PostScript graphics—but for plain old drawing and painting, you can't beat SuperPaint.

—Erfert Fenton

See Where to Buy or circle 795 on reader service card.

AGFA COMPUGRAPHIC P3400PS

400-dpi PostScript Printer

Pros: Fast and compact; includes 73 Adobe fonts; excellent print quality and paper-handling features. **Cons:** Expensive; blacks could be darker.

Company: Agfa Compugraphic Division.

Requires: Mac 512KE; LocalTalk.

List price: \$12,500.



There are laser printers, and there are laser printers. The former category includes LaserWriters and their competitors—office workhorses that print at 300 dots per inch. The latter category includes a handful of printers that cost over \$10,000, but print at between 400 and 600 dpi—shy of typeset quality, but close enough for many newspapers, in-house publishing departments, and service bureaus.

The Agfa Compugraphic P3400PS is in this second group. The P3400PS is the successor to Agfa's CG400-PS, which was the first mass-produced laser printer to offer more than 300 dpi. The P3400PS provides the same 400-dpi resolution as its predecessor, but it does so in a smaller package that costs \$17,495 less.

The P3400PS' primary competitor is Varityper's VT600, which costs \$4500 more but offers 600-dpi resolution. You might think its superior resolution makes the VT600 the better buy. It ain't necessarily so. The P3400PS has a number of other assets that make it preferable for certain applications.

It's Big, but Beautiful

Weighing 208 pounds, the P3400PS travels by freight and arrives strapped to a wooden palette. Once the machine is unshackled, however, setup is simple. Remove the obligatory packing spacers and install the imaging unit, which contains the printer's drum and its developer and toner powders. (Tip: Tighten the screw on the toner compartment completely. This reviewer didn't, causing the imaging unit to jam upon installation, which required an embarrassing service call.)



Agfa Compugraphic P3400PS

The P3400PS is built by Agfa, but its engine is from the mind of Minolta. The P3400PS' Minolta SP-100 engine prints at 400 dpi and handles paper sizes up to 8½ by 14 inches. It has a rating of 12 pages per minute with a duty cycle of 10,000 pages per month. The Varityper VT600 is also rated at a speed of 12 pages per minute, but it has a duty cycle of only 3000 pages per month.

Controlling the P3400PS' brawn is the Adobe Atlas Controller, which contains a 68020 microprocessor, 4MB of RAM, and a 20MB hard disk. The hard disk contains 73 Adobe fonts, including the 35 fonts present in most PostScript printers as well as such eminently usable faces as Korinna, Souvenir, Helvetica Light, Helvetica Black, Garamond, Optima, Lubalin Graph, and Lucida, to name a few.

Like the VT600, the P3400PS provides RS-232C serial, Centronics parallel, and LocalTalk connection ports. But unlike the VT600, the P3400PS provides emulation modes that allow the printer to imitate the venerable Diablo 630 and Hewlett-Packard's LaserJet Plus.

The P3400PS' paper-handling skill is another of its strengths. The VT600's single paper tray holds 200 sheets. The P3400PS boasts two trays, each holding 250 sheets. You can mix and match paper types and sizes, putting letterhead in one tray and second sheets in another, or legal-size sheets in one and letter-size sheets in the second. Better still, you can configure the printer to treat both trays as one 500-sheet tray: when the first tray is empty, it automatically switches to the second.

A Sharp Performer

If you think 400-dpi output is only marginally better than 300 dpi, think again. A 300-dpi printer produces 90,000 dots per square inch; the P3400PS lays down 160,000 dots per square inch. The difference is significant: italic type suffers less from the jaggies than with 300 dpi, and the subtle curves of typefaces such as Optima are rendered more accurately. And the extra resolution allows the P3400PS to produce halftones with more lines per inch. Thus, gray-scale scanned images print better.

Even so, the P3400PS' output doesn't compare to the 600 dots-per-inch output of a VT600. The VT600 prints 360,000 dots per square inch, making its output more than twice as sharp. The VT600 also produces richer, more dense black areas.

Under the loupe, the VT600's print quality beats the P3400PS', but on the test track, the opposite occurs. Because the VT600 must manipulate more memory to create its images, its print speed is slightly slower than that of the P3400PS, even though their controllers are very nearly identical.

But minor performance differences shouldn't influence your decision when it comes to purchasing a five-figure printer. Print quality, paper handling, built-in fonts, and price are more important issues. Varityper's VT600 produces sharper copy than the P3400PS does, but it loses in every other category. Therefore, the P3400PS isn't as good a typesetter as the VT600, but it's a better office printer. It straddles the fence between office workhorse and typesetter; it performs the former job superbly, and the latter reasonably well.

The bottom line: If you need the sharpest possible laser copy and you can afford to spend \$17,000 to get it, buy the Varityper, but note that you'll need to spend more to equip it with the same fonts that are included in the P3400PS. But if 400-dpi output meets your needs, you should buy the Agfa Compugraphic P3400PS. The \$4500 you'll save will pay for quite a bit of Linotronic output for those times when 400 dots per inch isn't enough.—Jim Heid

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THE ART IMPORTER 1.0

Font Creator

Pros: Easy to use; imports from all major drawing programs; allows inclusion of PostScript and PICT in programs that don't support those formats.

Cons: Can't set up kerning pairs; generates poor screen fonts. **Company:** Altsys Corporation.

Requires: Mac Plus; PostScript printer; Font/DA Mover 3.8. **List price:** \$99.95.



With PostScript, the distinction between type and graphics is a fine one. The first real curve-capable drawing program for the Mac, for instance, was Fontographer—Altsys' typeface-building program. Now its latest program, The Art Importer, has blurred that distinction even more. The Art Importer lets you turn up to 16 PICT or EPS graphics into a PostScript font (see "Made to Order"). You can create the graphics with your favorite drawing programs—Illustrator, FreeHand, Canvas, MacDraw, SuperPaint—then paste or import them into The Art Importer. When you use these special characters, they flow with your text and can be resized just like standard characters.

When you finish designing your character set, The Art Importer creates a PostScript font and accompanying screen fonts in your choice of sizes. Install the screen fonts, put the downloadable PostScript font in the System Folder, and you can use those graphics in any program with a font menu—even if it doesn't support PostScript or PICT directly. Just select the font and hit the right key.

Bear in mind, though, that you cannot include any bitmaps—bilevel or gray scale—in an Art Importer PostScript font. PostScript doesn't allow for it, so The Art Importer doesn't either.

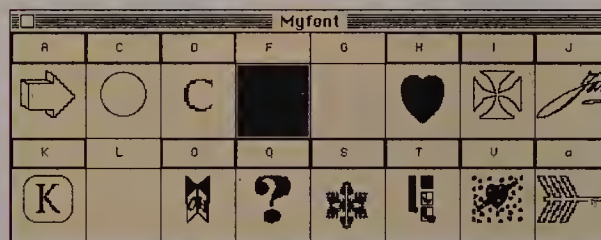
The Art Importer can, however, import color EPS images from FreeHand (including patterns and gradations) and color graphics from Illustrator, but the screen fonts aren't in color. You can then use these imported graphics as special fonts within a block of text, and FreeHand can separate them properly and print them

on color PostScript printers. PICT images can also be imported into The Art Importer, but only the patterns will come in, not the colors.

Fonts within Fonts

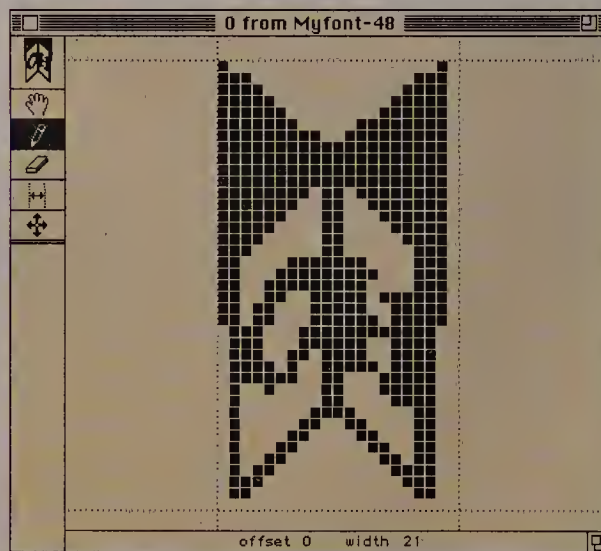
You can even include characters from downloadable PostScript fonts within the fonts you create with The Art Importer; for instance, you can place a label or some text within a graphic for a special effect. But you'll have to download those embedded fonts in advance or precede the Art Importer character with a single character (even a space) formatted in the embedded font so that the application you're using will download it automatically. You can use nested EPS graphics (EPS within EPS graphics—tricky to begin with) within Art Importer fonts, but this makes printing very slow and sometimes impossible.

The Art Importer prints sample sheets of a typeface with either a key map or a string of characters. The key map is a handy reminder of which graphics go with which characters, but if you don't have



Made to Order

The Art Importer lets you build PostScript typefaces containing up to 16 characters from PICT and EPS graphics.



Fine Tuning

The Art Importer builds screen fonts in your choice of sizes and lets you edit them and adjust the positioning and spacing (but not kerning) for each character.

one you can use Apple's Key Caps DA. The Art Importer's screen fonts are hard to read, so it's often hard to tell what graphic they represent. You might well want to buy FontSizer from U.S. MicroLabs, which uses the brains of a PostScript printer to build higher-quality screen fonts.

The Art Importer lets you edit its screen fonts in FatBits mode so they're more recognizable. You can adjust the position of the character within its character matrix so you can have it descend below the baseline or sit off the line, as with a superscript (see "Fine Tuning"). You can also adjust the width for each character—even reducing it to zero so the following character lies on top of it—but you can't create kerning pairs or adjust ascender or descender limits. Plan on spending some time adjusting character spacing and positioning to make your graphic characters look right within a line of text, and consider buying a kerning pair editor as well.

Because you can't modify Art Importer fonts while they're installed, a resource manager such as Suitcase or MasterJuggler is a virtual necessity. You'll need to test your Art Importer fonts with your software, then go back to tweak character spacing and positioning, then test again. By using a resource manager you can install and reinstall your fonts on the fly without resorting to Font/DA Mover.

Art Importer fonts are numbered using Apple's new NFNT numbering scheme (you choose the number), so programs that don't support that scheme—generally older programs—won't be able to use its fonts. I found, however, that most programs handle them fine.

If you're looking for a complete typeface-manipulation tool—including the ability to exceed 16 characters in a font and build kerning pair tables, you'll need Altsys' Fontographer/Fontastic combination or one of the new breed of PostScript font editors. For logos, signatures, dingbats, and other special characters, though, The Art Importer is a natural. It's easy to use, it's compatible with the most important object-oriented file formats so you can stick with your favorite drawing program, and it's inexpensive.—Steve Roth
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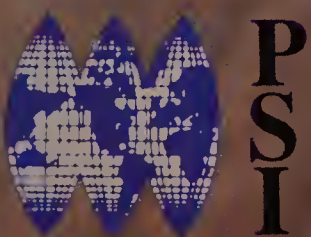
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INTERSECT CDR-77

CD ROM Reader

Pros: Well-engineered, sturdy hardware; slightly faster and less expensive than most CD ROM drives.

Cons: Poor software; scanty documentation.

Company: NEC Home Electronics.

Requires: Mac SE. **List price:** \$999.



The Intersect CDR-77 reader from NEC adheres perfectly to current trends in the Mac CD ROM (compact-disk read-only memory) industry: it's less expensive than its predecessors, reads both data and audio CDs, and lets you have a potential 500 megabytes of data online at one time. Unfortunately, it also suffers from the same technological failings as its forebears. Like other CD ROM players, it's sluggish; it's useless for storing your own data (CDs are prerecorded and not erasable); and it's hampered by the limited number and high price of commercially available CDs.

Beginning to CD Light

Intersect CDR-77 looks like a cross between an external floppy drive and a shoebox; it's longer than the Mac, though, so it doesn't look quite at home sitting beside one. Its front panel is precisely the same as that of other CD ROM readers: there's a volume knob and a headphone jack (for listening to audio CDs), an eject button, and the disk slot. On the back you'll find the power switch, RCA jacks for hooking the reader up to your stereo, and the SCSI port for connection to your Mac.

You can play an audio CD only if the Mac is connected and turned on. First you need to open up the Mac interface kit provided with the drive. From the floppy disk contained therein, you copy several INITs into your System Folder and turn the Mac off. The Mac gets turned on again only after the CD reader is up and running. You must place the CD in the Intersect's removable plastic cartridge tray before inserting it into the machine. (Contrast this arrangement with cartridgeless systems like the Toshiba CD ROM reader, whose laser lens becomes cov-

ered with dirt, and hence unusable, after just a few months of use.)

If you've performed the steps correctly, an icon representing your CD will appear on the desktop; the Mac displays the CD's contents exactly as it would those of a huge floppy disk. You will notice, however, that programs and files on the CD take a long, long time to open (a program that took 6 seconds to launch from a hard disk took 15 seconds from a floppy and 27 seconds from the Intersect). Ironically, the Intersect ranks among the faster CD ROM readers on the market; even so, its 500-millisecond average access time is roughly 25 times slower than that of a typical hard disk.

Except for its startling slowness, however, the NEC drive acts precisely like a locked floppy disk: you can rearrange files and folders in its window, but these changes won't be remembered the next time you load the disk. And you can eject any CD by dragging its icon to the trash. What little sound the Intersect makes when accessing a disk most resembles the sound of two blocks of Styrofoam being rubbed together.

Life in the Big CD

The Intersect has one significant problem: its audio software, which comes in the form of INITs, files, and miniapplications (see "Tears for the Tracks").

The only way to play an audio disk is by double-clicking the NecCdPlay application—a tiny program that simply starts



Intersect CDR-77

your CD playing and then quits back to the Finder. The CD plays from beginning to end; you have no options for playing specific tracks, repeating tracks, fast-forwarding, or even pausing the play. As a matter of fact, the NecCdPlay program can't even stop the playback; for that you'll need the other program included with the drive—called, of course, NecCdStop.

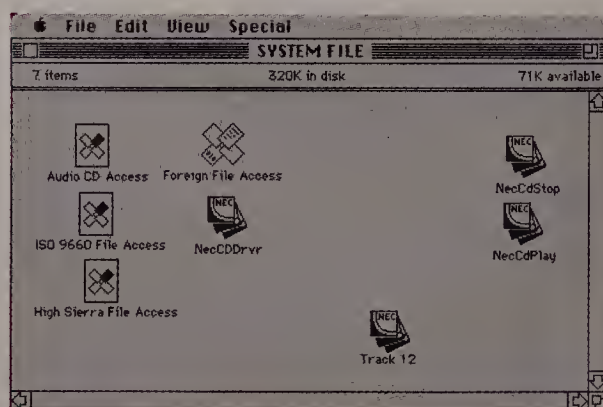
This system is colossally inconvenient—you've got to quit whatever program you are in and launch a second program just to stop playback (if you harbored fantasies of slipping on a little Mozart while you're crunching this quarter's sales figures, forget them). The Intersect's audio software looks even worse when compared with the desk-accessory controls provided with CD readers from Apple and other companies, which give you complete control over the playback of individual tracks on an audio CD.

Six-Month CD

The Intersect CD reader appears to have been designed with IBM PCs in mind; unlike the Mac version, the IBM version of the audio software lets you specify which tracks to play. Also, the documentation provided with the Mac interface kit is a barren leaflet with little useful information. It's a shame, too; the reader itself is a well-engineered piece of equipment.

NEC is reportedly hard at work improving this product's software. Once this has been accomplished, the Intersect CDR-77 will have a better chance at holding its own in the market, since it's priced about \$200 lower than most drives.

(continues)



Tears for the Tracks

The Intersect CDR-77's software includes five INITs (left) and two programs (right). The file Track 12 represents one track on an audio CD; you can't launch it, but if you select Get Info you'll find out the length of the track (in minutes and seconds). One INIT, both programs, and all track files have identical icons.

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At present, both CD ROM drives and disks are still very expensive and limited in number. With the introduction of erasable optical disks for the Mac, some consider CD ROM's future even foggy. If you're set on a CD ROM reader, however, consider the Intersect only after calling NEC to find out to what extent its software has been updated.—David Pogue

See Where to Buy or circle 771 on reader service card.

LIAISON 2.0

Software that Bridges Networks

Pros: Excellent low-cost method for bridging LocalTalk and EtherTalk networks; supports modem sharing; includes dial-in support for remote access; good security control, including callback support; maintains log of all calls. **Cons:** Can interfere with foreground tasks during heavy network activity; no site license available; serialized copy-protection scheme. **Company:** Infosphere. **Requires:** Mac Plus; modem or Ethernet interface board for Ethernet. **List price:** \$295.

Prior to Infosphere's introduction of Liaison, the only way to bridge AppleTalk networks to form large internetworks was with hardware. Now Liaison has dramatically reduced the cost of bridging networks by offering a software-only solution.

Starting a Liaison

Liaison installs as a Chooser-selectable device. Once you copy the Liaison INIT file into the System Folder and restart, Liaison senses what network interfaces (LocalTalk, EtherTalk) are available and chooses a default configuration.

To customize the Liaison configuration, select Liaison in the Chooser and change the appropriate parameters. You can tell Liaison to bridge two LocalTalk networks (one on the printer port, one on the modem port), to bridge LocalTalk and EtherTalk, or to provide shared access to a modem attached to your Mac. As other network interfaces, such as Arcnet and Token-Ring, become available for the Mac, Liaison will be able to bridge LocalTalk to those networks as well.

Liaison can act as a bridge between the built-in LocalTalk port and an EtherTalk interface board in a Mac II. This bridge can be useful if you need an inexpensive way to make a LaserWriter available to Ethernet Mac users because any device attached to the LocalTalk network that's attached to a Mac SE or II will also be seen by EtherTalk users.

The beauty of this setup is that you don't need to devote a Mac to acting as the bridge. Liaison runs in the background, and even with heavy-duty use of a LaserWriter through the bridge, it's unlikely that you will notice Liaison's activity if you use a Mac II. If you use an SE as the bridge, your other programs will slow down some—not as much as when Apple's PrintMonitor runs under MultiFinder, however.

You can ask Liaison to assign a higher priority to foreground tasks if the background activity bothers you. In most cases, you should install the most heavily used Liaison bridges as tasks on a file or mail server, rather than on an individual's workstation.

What's Your Name?

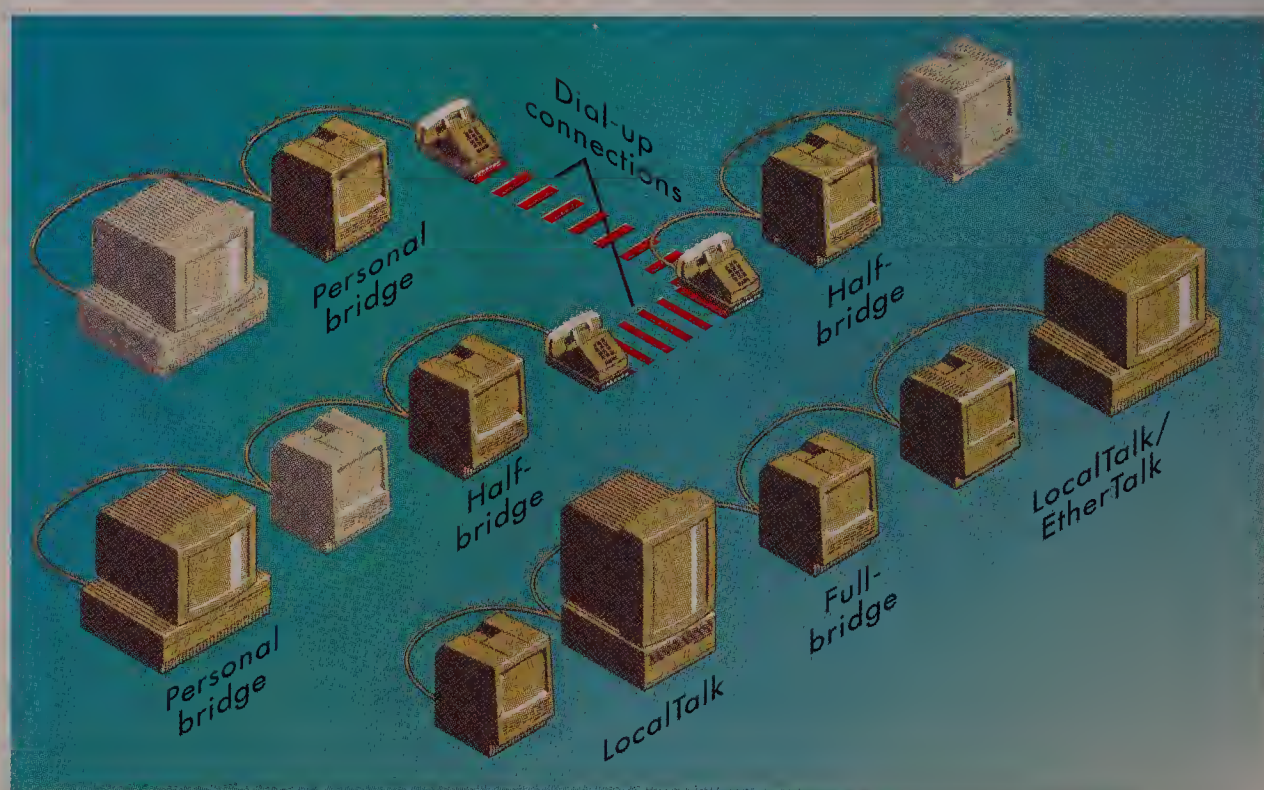
Liaison can check any other bridges on your network, learn what network num-

bers and zone names have been assigned, and add them to its own database. That database, a part of any bridge, is an important part of bridge operation on AppleTalk networks.

Although I had no problems using Liaison with the Hayes InterBridge and the Shiva NetBridge, Liaison does have problems automatically assigning a network name to a dial-up network. Your best bet in this case is to assign the name manually. Another problem to watch for is when Liaison is asked to get the network name and number from another bridge (set the zone name to *). If Liaison is the first bridge to start up on the network, it stays inactive because it doesn't know how to select a default name. So try to ensure that other bridges on your internetwork start first.

Building Bridges

Liaison has a great deal of built-in versatility. Not only can it function as a bridge between two LocalTalk networks, between two FlashTalk networks, or between LocalTalk or FlashTalk and an installed Ethernet board, but Liaison can also function as a bridge between a network and a modem that's attached to the (continues)



Bridge Styles

Liaison supports three types of bridging, as shown in this drawing. A personal bridge can provide access to a half-bridge for a single Mac, but not for the entire network (top). If two half-bridges are connected via modem (middle), users of both networks can communicate with each other. A full-bridge doesn't require the use of modems and allows users to link two networks together to form a larger network (bottom).

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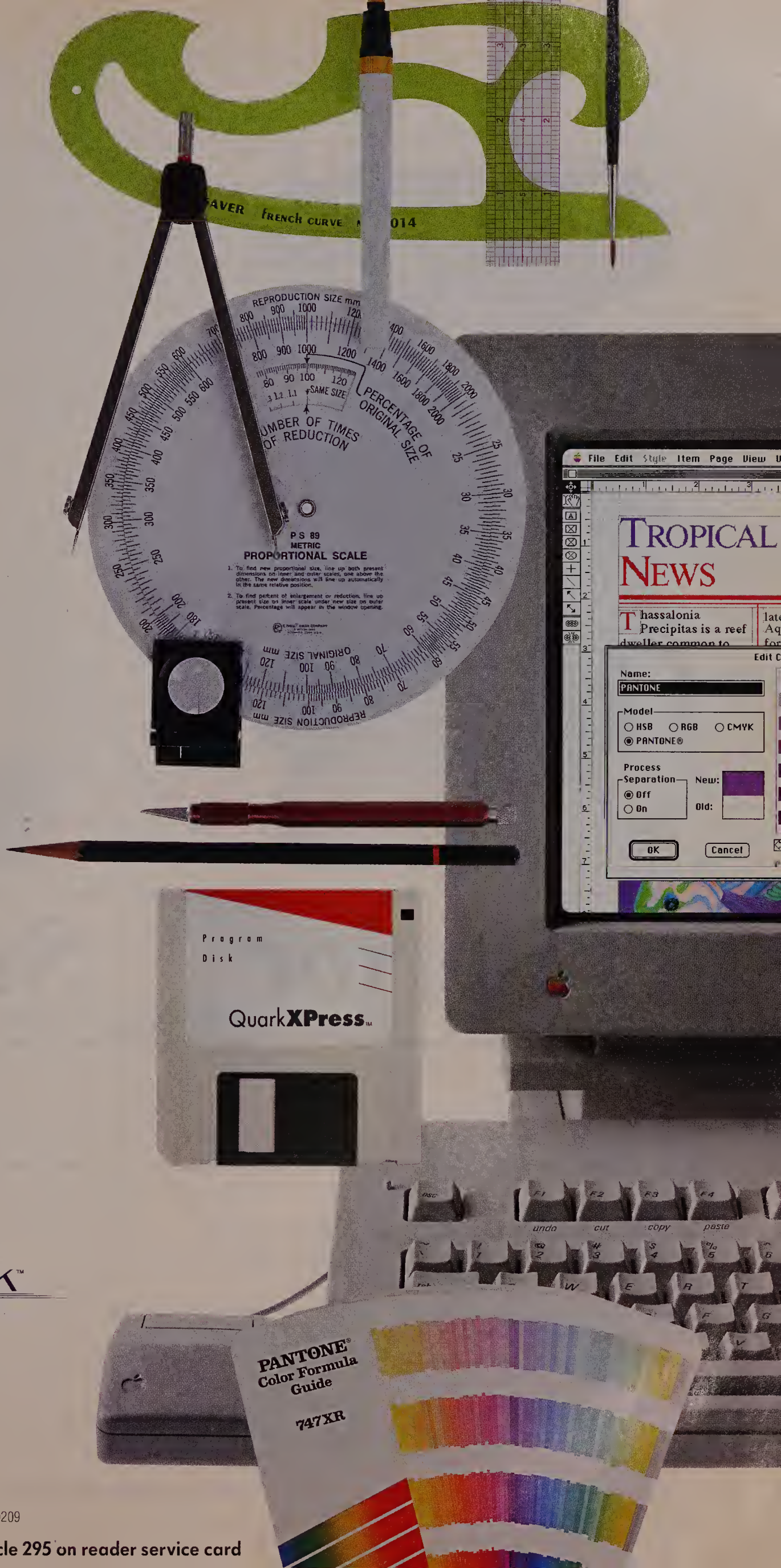
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Private Lines

This setup window is used to define the phone numbers that Liaison can access to establish either a private connection (that is, for one user only) or a network-wide connection, such as a half-bridge (in that case, the Shared with Group button would be checked).

bridging Mac's serial port (see "Private Lines"). Liaison's security features allow you to control access to either the bridging node or the entire network on a user-by-user basis. In addition to controlling access on a zone or network basis, Liaison has also introduced the concept of hiding up to three zones from dial-in users. This lets you prevent remote users from seeing your more sensitive zones, such as accounting or R&D.

Should you choose to install Liaison as a half-bridge to support dial-in users, you can store the phone number of each remote user as a part of account information. When a remote user calls the Liaison half-bridge, Liaison answers the phone call, the user enters the proper account name and password, and Liaison disconnects the call. Liaison then initiates a call of its own back to the remote user to establish a usable link to the network.

Two copies of Liaison can serve as half-bridges for connecting to Liaison-controlled modems to link two networks. Previously, linking networks with half-bridges was possible only with the Hayes Interbridge, which goes for nearly three times the price of Liaison. (The new TeleBridge from Shiva, which sells for \$499, also has this capability.)

In addition to supporting half-bridges and full-bridges (see "Bridge Styles"), Liaison also introduces the concept of a *personal bridge*, which allows you to initiate a connection from your own Mac to a half-bridge running under Liaison. While a single Liaison package can only be used for a full-bridge or a half-bridge on one Mac, Infosphere allows you to make as many personal bridges as you need from

a single distribution disk. To do so, you simply copy the Liaisonet INIT, rather than the Liaison INIT, to your System Folder. Of course, you'll still need to install Liaison on a Mac that will serve as the half-bridge to that network. Users of personal bridges then dial that half-bridge. Think of it as Infosphere's software answer to the Shiva's NetModem and Solana's R-Server: all of your remote sites will use Liaisonet to dial your home office, which is running Liaison on a Mac connected to a modem.

Say "I Do"

Although I've not tested Liaison under extremely heavy traffic conditions, it's conceivable that Liaison, being a software-only product running in the background on a Mac, will not be able to compete with a dedicated hardware box designed for the same task (such as the Kinetics FastPath for EtherTalk bridging or the Shiva NetModem for modem sharing). If you're looking for a gateway to connect LocalTalk to another network, such as TCP/IP, you're stuck with using hardware. However, in most cases, Liaison provides enough power and speed to suit anyone's everyday needs for bridging networks. And at a price of \$295 it's a bargain. —Dave Kosiur

See Where to Buy or circle 773 on reader service card.

★


McMAX 2.0

Programmable Relational Database

Pros: Fast; highly dBase compatible; unlimited distribution of run-time applications. **Cons:** Still fairly austere by Mac standards; no design aids.

Company: Nantucket Corporation. **Requires:** Mac 512KE. Second disk drive or hard disk recommended.

List price: \$295 (includes run-time version).

 The original version of McMax was one of the first Macintosh database programs to show respectable speed. In most benchmarks, it simply zipped past rivals like 4th Dimension and Double Helix II. The problem was that compared to those programs, it hardly seemed like Macintosh software. Basically a 9-point Monaco alphanumeric

data engine, McMax made it appear that the Mac was being used as a terminal connected to a particularly efficient IBM PC AT running dBase III. McMax's main attraction clearly was to dBase programmers who wanted to preserve their investments in programs and training.

The new version will still appeal mainly to applications developers who are already versed in dBase as a language. If you simply want to store and retrieve data, simpler flat-file programs (Microsoft File, FileMaker II, for example) are a better choice. If you need to develop one or two relational custom databases, it's easier to design them in Double Helix II or even using 4th Dimension's skeleton application generator. What you get with McMax—and with FoxBase+/Mac—besides standard relational database capabilities is the ability to create applications that don't bog down on large data files.

McNew, McWonderful

Mac users generally expect to see screens in which applications are operated through menu choices, and in which text can be enlivened by style and size variations. The omission of these features in the original McMax caused loud complaint. Fortunately, they have been included in version 2.0 (see "New Look for McMax"). The command `@ 5, 10 SAY "Macworld" STYLE 3, 4, 0, 16, 341`, for example, writes the name of your favorite magazine in 16-point Geneva, underlined, in green, starting at line 5, column 10 on your screen. There are no input screen graphics or PICT-type fields, though.

Actually, Nantucket has gone beyond mere feature tinkering in this version. McMax 2.0 includes a straightforward way to program not just the main menu bar in an application, but hierarchical submenus as well. In writing a program for end users, it is thus possible to limit operations to a set of neatly structured choices, resulting in thoroughly debugged (McMax also has a built-in debugger), crash-proof, and easy-to-document custom database programs. McMax 2.0 also supports HyperCard XCMDs and XFCNs, so you can import data manipulation utilities originally written for HyperCard.

(continues)



William Lombardo, Modelmaking & Illustration
Created with Swivel 3D and PixelPaint



Roy Santiago, Business Presentation
Animated Swivel 3D images in VideoWorks

*"A superb presentation tool...
Swivel 3D raises the standard of
3-D graphics on the Macintosh."*
Joost Romeu, MacWeek

*"It's a speed-demon. It's your
basic \$395 must-have."*
Salvatore Parascadolo, MacUser

*"Creating objects with complex
surfaces couldn't be easier...only
Swivel 3D lets you cast shadows
on images."*
David Peltz, MacWorld



Jim Ludtke, Graphic Artist
Magazine illustration created with Swivel 3D.

*"An amazing 3-D visualization
tool that is easier to use than
any of the 3-D packages...."*
Laslo Vespremi, MacWeek

*"The most intuitive interface ever
created for moving around in a
computer environment....
A visualization tool that will keep
you up around the clock —
with a smile on your face."*
Jack Davis, Verbum

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Swivel 3D, the essential Graphics Tool

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Swivel 3D is the first and only program to feature Linking. Linking allows you to create realistic images with wheels, doors, levers, arms, legs, and objects that move.

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Minimum System
Requirements: 1 meg

PARACOMP

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These tests were performed on a Mac SE with a Macintosh Hard Disk 20SC and RAM cache set to 256K. Times will vary with cache settings and disk speed.

DBASE CLONE BENCHMARKS		
	McMax 2.0	FoxBase+/Mac 1.1
Sort (10,000 records) on character field	94	37
Index (10,000 records) on character field	68	14
Find (10 records in 10,000-record file)	54	9
Do (5000 iterations of complex computation with internal branch)	30	30

All times are in seconds.

Additional user-defined features, called Reads, allow manipulation of user-provided input down to the level of individual fields. (The term is slightly misleading; ordinarily the intended user of this feature is you the programmer, rather than the end-user of the application.) Basically, rather than simply reading in data in the order it's supplied, the Get command, which specifies a whole record, lets you manipulate data as it is being entered. The Get function can be used to do simple data comparisons such as range validation or arithmetic on entered quantities. Procedures with Reads can involve all kinds of data (including choices specified by buttons), and Nantucket provides several pages of expandable examples.

Please note, however, that the use of any of these enhancements is a matter of line-by-line programming. There are no design aids to assist in laying out your colorful, multifont data input screens—you experiment with layouts at the command-line level. Likewise, McMax does not offer you, the programmer, a series of menu choices to specify the creation of

applications menus for the end user. Once more it's a matter of straight programming, just as it would be in C or Pascal. One advantage, however, is that database command sets are a more efficient language for database creation. The other advantage is a speed/comfort trade-off as extreme as a rocket sled versus Cleopatra's barge. McMax offers you almost no conveniences compared with a lush developer's environment like Double Helix II, but your applications can run 20 to 30 times faster.

Clone Race 2000

The real choice for most users with some dBase background is between FoxBase+/Mac and McMax. McMax claims to be "the fastest database for the Macintosh." Running a variety of benchmarks (a representative selection is shown in the table) proved this claim can be true in a particular context: executing program files using the fastest-executing McMax commands. For most ordinary database operations, such as indexing or locating records, FoxBase is two to four times faster. McMax showed a speed advantage over FoxBase, ranging from several percentage points to a factor of two, on short programs that read in database files and processed numeric fields using complex expressions. This advantage was not seen with programs that manipulate character fields; here FoxBase was slightly faster. All in all, complex McMax applications distributed with the unlimited run-time unit will be comparable in speed to FoxBase applications—either modestly faster or slightly slower, depending on program details.

Both programs run dBase .prg files ported from MS-DOS with no modifica-

tion and use dBase files processed through Apple File Exchange software. A major advantage FoxBase has over McMax (besides better support for screen design) is network support, including the ability to manage data over a network with IBM PCs and Macs using a single FoxBase application.

Documentation for the two packages is comparable. FoxBase's technical support staff is significantly easier to contact than McMax's; Nantucket's primary focus is a PC program called Clipper, rather than McMax.

Like the original, release 2.0 is austere and very fast, and its extensions haven't interfered with its ability to run imported MS-DOS programs. While allowing you to program easy-to-use applications, it still presents you, the programmer, with a plain screen featuring the notorious dBase dot prompt as the starting point for your labors (an Assist menu item at least helps you get started with ordinary data-file manipulation). Although it calls for more hard work than most other Mac databases, it's the least expensive package for developing distributable custom database applications, and it has a certain minimalist charm.—Charles Seiter

See Where to Buy or circle 778 on reader service card.



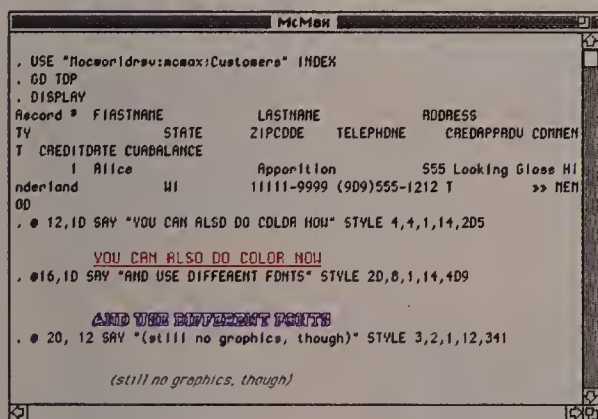
NUMBERMAZE 1.0

Educational Math Game

Pros: Enjoyable to play; educationally sound; unusually customizable. **Cons:** No large-screen or color support; doesn't cover fractions or decimals. **Company:** Great Wave Software. **Requires:** Mac 512K, 800K disk drive (400K version available). **List price:** \$49.



In 1986, when Apple was insisting that the Macintosh was strictly for business, Great Wave Software introduced KidsTime, a children's software package that proved that not only was there a market for quality educational software but also that the Mac was a marvelous platform for it. Now Great Wave is shipping NumberMaze. Unlike KidsTime, a package of five different (continues)



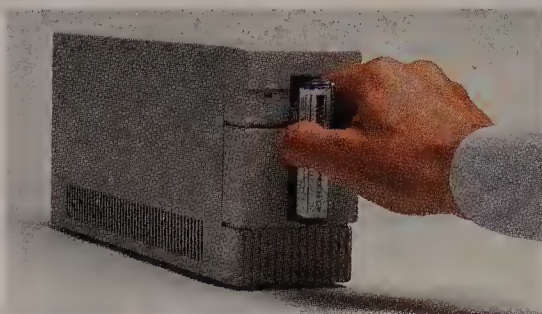
New Look for McMax

McMax 2.0 supports large screens and typeface enhancements. The Say command has been extended to allow specification of fonts, point sizes, and colors.

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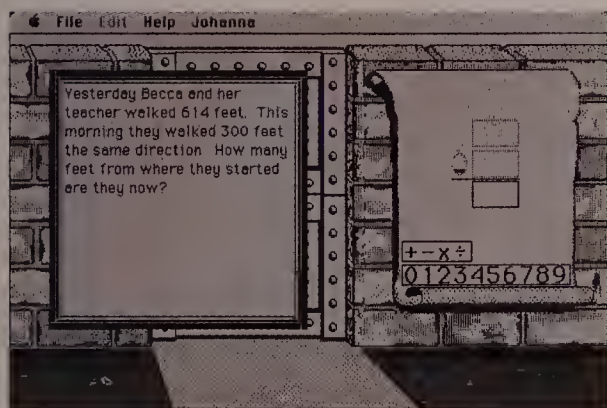
educational games, NumberMaze has a specific educational objective: to provide young learners (ages 5 to 12) with an entertaining tool for learning and practicing arithmetic.

Let Me Count the Ways

There are many math drill-and-practice Macintosh programs available for kids today: Math Blaster, Turbo Math Facts, MathTalk, and Math Wizard, for example, are all designed to make the learning process fun. But none of these programs taps the computer's potential as a thorough, flexible, entertaining, and patient electronic tutor the way NumberMaze does.

Like the others, NumberMaze couches math drill and practice in a game format, rewarding learners for correct answers. In NumberMaze, however, the student uses the mouse to maneuver the playing piece through a maze toward the castle in the corner of the screen. Simple enough, except that the maze is riddled with doors, gates, and walls that can only be passed by solving math problems.

Kids tend to tire of this type of activity quickly unless there's some variety; NumberMaze has variety aplenty. For starters, the playing piece changes from game to game: sometimes it's a clip-clopping horse being lured by a mouse-controlled carrot, sometimes a buzzing race car following a checkered flag. In addition, correct answers trigger animated sequences, such as opening doors, lowering ladders, or disappearing bricks (see "Open the Door"). There are enough of these sequences to keep kids interested for many a game.



Open the Door

The door will open when the player translates the word problem into numbers and solves it.



The NumberMaze software-testing committee

Even when the barriers start repeating, the game stays fresh because new elements are introduced. Some doors require keys that must be picked up in another part of the maze. In more advanced mazes, walls are invisible until the player bumps into them, or become visible when bumped into and then disappear a few seconds later. As the player progresses to more advanced levels, the maze becomes more complex, and maze passages become smaller.

Variety is important, but youngsters want rewards, too. NumberMaze reinforces each maze traversal with a new on-screen prize. And when a child successfully completes a math level, you can print him or her a certificate of completion.

But Is It Learning?

NumberMaze's flexibility is also apparent in its educational design. Unlike other math programs, it doesn't limit itself to a narrowly focused curriculum. It's designed to help with arithmetic problems from the simplest counting exercises for kindergartners to complex, multidigit long division for 12-year-olds.

This curriculum is carefully modeled on leading textbooks. Children can start with the easiest level and work their way up sequentially, skipping forward or backward if they need to. The disk also includes curriculum files for particular grade levels and a Custom Maze program for designing curricula for special needs. The excellent manual provides thorough instructions for customizing the program to suit your instructional needs.

For most students, the standard curriculum progresses at the right pace. NumberMaze carefully monitors each response, gives hints when needed, and keeps track of success rates in each category of problem. If a particular type of problem (for example, addition with carrying) is causing too many errors, the program provides more of those exercises.

NumberMaze is designed to be used in either the classroom or the home. Great Wave's licensing agreement makes it possible for up to fifty students to legally share the same copy, provided that no two students are using it at the same time. The program can record a student's progress in a password-protected file, and these files can be displayed or printed. NumberMaze even uses students' names to personalize the story problems.

Ask the Experts

I think NumberMaze is terrific, but don't just take my word for it. Listen to these testimonials from my no-holds-barred software-testing committee:

Six-year-old Chelsea: "What I liked best was that every time you got to the castle, you got something like a sword or a teddy bear."

Seven-year-old Johanna: "It's a good way to learn math because you have to figure out all these math problems. The mazes are fun."

Nine-year-old Benjy: "I think it's just a good game. It's neat how they have all these different scenes."

Nine-year-old Bethany: "It's a better way to learn math. I played it every day when I got home from school, and I never got bored with it from beginning to advanced levels."

Eleven-year-old Ben: "It's the best math program I've ever played. I play it almost every day, and I never get bored. It helps you along if you have trouble with a math problem. It lets you do almost all the work."

Why do kids like this game so much? Ben's last comment may hold the key. While most computer math games keep the computer firmly in control, NumberMaze lets the child take charge.

—George Beekman

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FASTAT 1.0

Statistics Program

Pros: Easy to use; includes graph-editing tools.

Cons: Not particularly fast. **Company:** Systat Inc.

Requires: Mac Plus, hard disk.

List price: \$195.

FASTAT

From the point of view of a Macintosh user with modest statistical-computing requirements, there are three things wrong with Systat, the most comprehensive stats package. First, it's *too* comprehensive, including many esoteric tests only dimly remembered from college courses. Second, it's barely a Macintosh program, relying heavily on a BASIC-like command-line interface. Finally, it costs enough (\$595) to warrant a professionals-only designation.

Now, however, there's a version of Systat that offers a reasonable array of tests, a menu-driven interface, and an aggressive price. Systat, Inc. plans to distribute Fastat in cooperation with the publishers of standard college-level statistics textbooks.

Passing the Tests

You pass data sets to Fastat through a "spreadsheet-style" data editor (table-style might be more accurate) that can also open documents saved as Text in other applications, typically spreadsheets or databases. You can then invoke statistical tests or exploratory data graphs from menus that feature the names of the tests and icons that represent them.

Fastat's set of statistical tests would be respectable even for a program costing twice as much. Besides standard descriptive statistics (mean, standard deviation, and frequency distribution), you get regression and correlation analysis, ANOVA (one-, two-, *n*-way, and repeated measures), ANCOVA, four types of nonparametric tests (sign, Wilcoxon signed-rank, Friedman, and Kruskal-Wallis), factor analysis, and an assortment of operations on time series data (smoothing, seasonal decomposition, autocorrelation, and partial autocorrelation). Data sets can also be

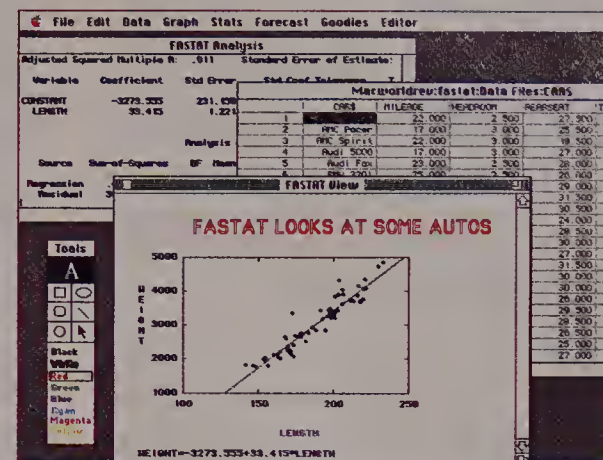
transformed through an extensive recode option, which is how you are expected to handle nonlinear regression, for example. Definitions of key statistical terms are available through a simple interactive help system.

These tests, based on algorithms perfected in Systat, have been thoroughly debugged for the numerical anomalies that sometimes plague new statistics packages. The real value of Fastat, however, is in its set of facilities for exploratory data analysis. While not as exploration oriented as Data Desk, Fastat nonetheless allows rapid graphing in a variety of styles, including scatterplots, boxplots, stem-and-leaf plots, histograms, 3-D display, and scatterplot matrices. Using Fastat's data-editing tools you can connect individual plot points to table rows in the data editor (either from graph-to-table or from table-to-graph) and you can select point sets with a frame or lasso in a plot and save them to named subset files for further analysis. Without much effort, you can analyze data visually until correlations or other significant relationships become apparent. That, in fact, is the whole point of the new style of data analysis; you look at the data until you are sure that subsequent number-crunching-only analysis won't lead you astray.

Slow but Steady

Fastat is not an entirely accurate name for this program. You can learn to use it relatively rapidly, but its own operations are not notably speedy. Importing a 10,000-record test file took 40 minutes in Fastat, compared to just under 3 minutes for StatView SE+Graphics. Computing descriptive statistics on large files takes twice as long as it does in Exstatix and three times as long as in StatView SE+Graphics. If, however, your data sets generally run only to a few hundred records, you will find Fastat's computational speed acceptable.

Another operation that could stand improvement is graph enhancement. Although a palette of graph-enhancement tools can be popped up from the Goodies menu (see "Color by Numbers"), in actual practice, titling, sizing, and otherwise modifying basic graphs for use in a Laser-



Color by Numbers

Fastat has an assortment of tools for enhancing plain statistical graphics and offers color legends and labels. The facilities aren't as extensive or easy to use as those in StatView II, but at Fastat's price they're a nice bonus.

Writer-printed presentation requires an annoying amount of tinkering to get accurate control of effects. If you hope to use a statistics package to generate presentations for a business or for statistical consulting, Fastat is not your best bet—its real strength is in combining a solid test set and exploratory graphics with modest presentation features.

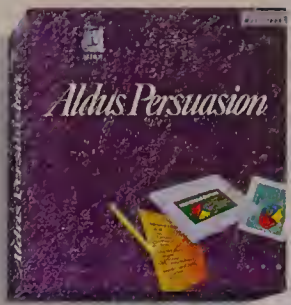
What Counts

In addition to a strong showing on analytic basics, Fastat includes some useful extras. A Movie option lets you play back stacks of graphs—which can be an informative way of examining families of data sets. Another option allows you to use command files to automate repetitive operations. In a way this is a throwback to the original anti-Macintosh, noninteractive, command-line design of Systat, but it gives you an alternative to performing dozens of mouse-clicks over and over again on batches of related files. Neither of these options would be worthwhile unless the underlying graphing and analysis facilities were powerful; fortunately, Systat Inc. has loaded its junior product with enough power to satisfy all but professional statisticians.

If your statistics test requirements aren't particularly esoteric and if your presentations don't call for shaded 3-D Technicolor graphics, Fastat has everything you need and at a bargain price too.

—Charles Seiter

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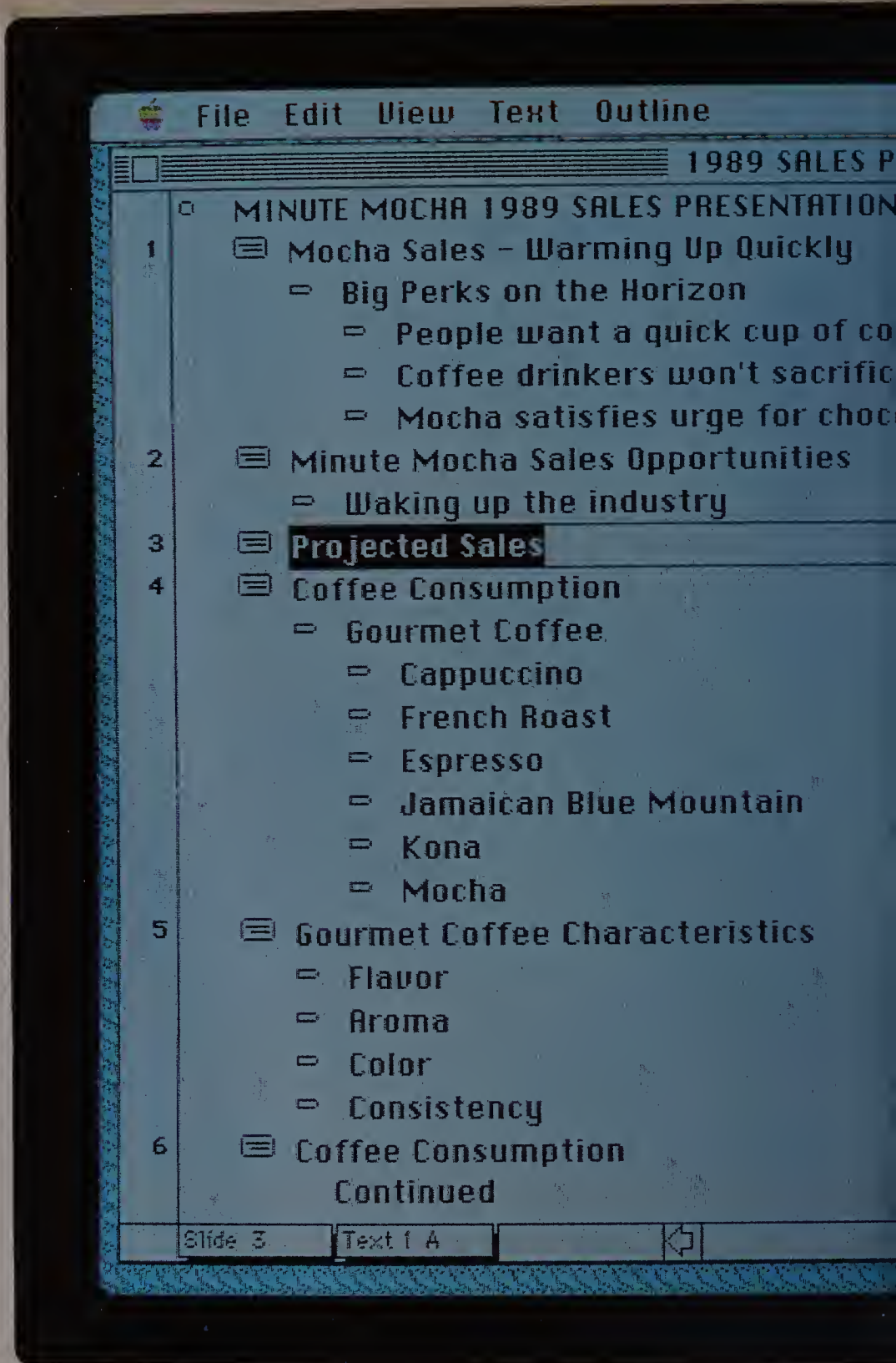
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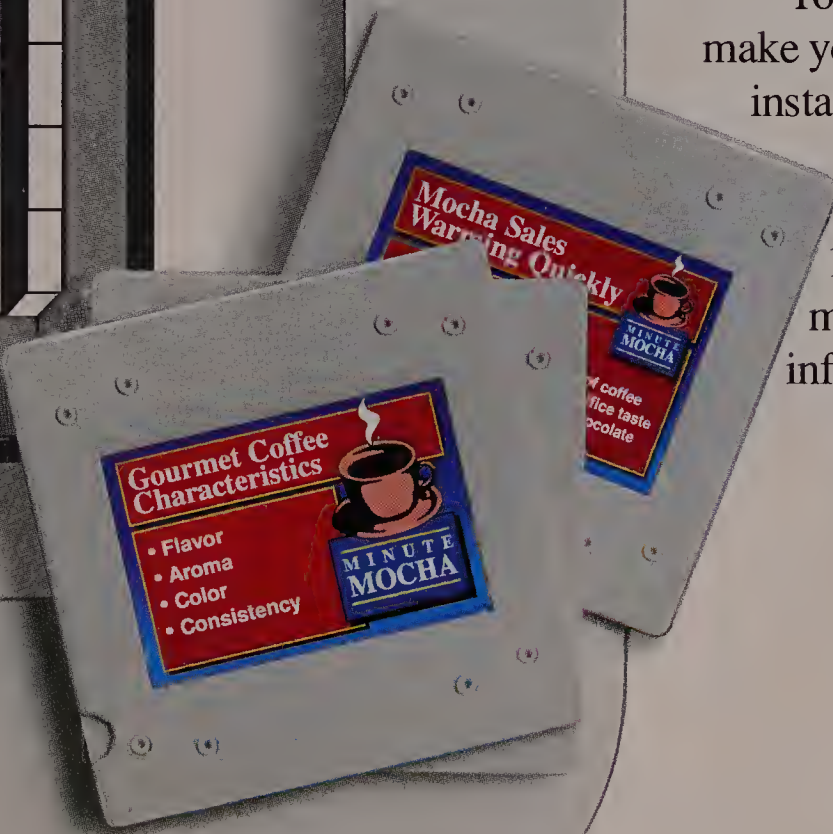
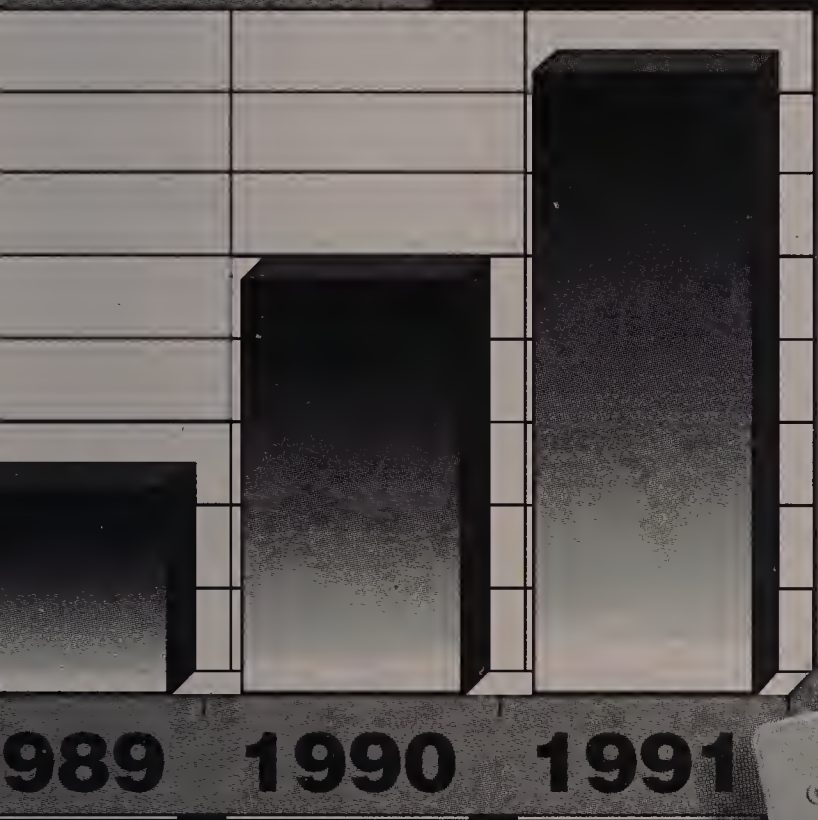


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NETWARE FOR THE MAC 1.0

Integrates Mac and PC Networks

Pros: Full AppleShare support (using LocalTalk and/or EtherTalk). **Cons:** Costly; time-consuming to install; takes a long time to display folders containing many DOS files. **Company:** Novell. **Requires:** Mac 512KE and IBM PC or compatible with the Intel 80286 or 80386 CPU; LocalTalk or Ethernet. **List price:** NetWare for the Mac \$200; Advanced NetWare 2.15 \$2995; SFT NetWare 2.15 \$4695.



NetWare provides disk fault tolerance, integrated power-failure notification, and advanced security features for DOS-based networks. The Macintosh version, NetWare for the Mac, additionally provides PC-to-Mac and Mac-to-Mac file sharing by providing complete AppleShare support. Most of these features are not available on other servers supporting Macs. Novell's NetWare for the Mac is an add-on to SFT (System Fault Tolerant) NetWare version 2.15 or Advanced NetWare version 2.15. NetWare for the Mac must be purchased separately. The initial release of NetWare for the Mac requires that your network contain an IBM-compatible workstation for system administration. When NetWare is ordered through a reseller, a fully functional server can be delivered to your doorstep. If you are new to NetWare, however, the large box containing over 20 manuals might seem overwhelming.

Installation requires four steps: (1) preparing the server's hard disks and configuring the server's operating system for the selected drives, network adapters, and server characteristics; (2) configuring the network shells for each network adapter type to be used by PC workstations in the network; (3) installing AppleShare 2.0.1 client software and the NetWare DA and copying the NetWare Control Center program onto a Mac (included with NetWare for the Mac), and (4) establishing directories, users, and access privileges from a PC workstation. The complete procedure will take about two days.

One thing to consider when adding Macs to Novell networks is the physical connections. Novell expects most Macs to remain on a separate LAN and connect through an internal server bridge, a Novell board. Novell does not currently support any other AppleTalk boards. The only restriction on the AppleTalk LAN is that it cannot be LAN A. Because most Novell networks use Ethernet, there is a potential problem with mixing LANs. Usually, if a Mac user generates a lot of network traffic, the inclination is to put that Mac on Ethernet also, to increase the network throughput and get the Mac off of LocalTalk. However, if you bridge the LocalTalk LAN into Ethernet through the Novell server, the Macintoshes with Ethernet boards cannot access any LocalTalk LAN resources, other than LaserWriters. In other words, they won't see network modems, mail servers, gateways, or serial devices that are on the LocalTalk network. The only way around this seems to be to bridge the LocalTalk LAN through an external bridge to the server, such as a Kinetics FastPath.

Using NetWare for the Mac

NetWare usually starts up when you simply turn on the machine. However, a

keyboard entry is required to start NetWare for the Mac on the server. In the event the server accidentally shuts down or restarts, Mac users can't access the server until someone enters the required keystrokes.

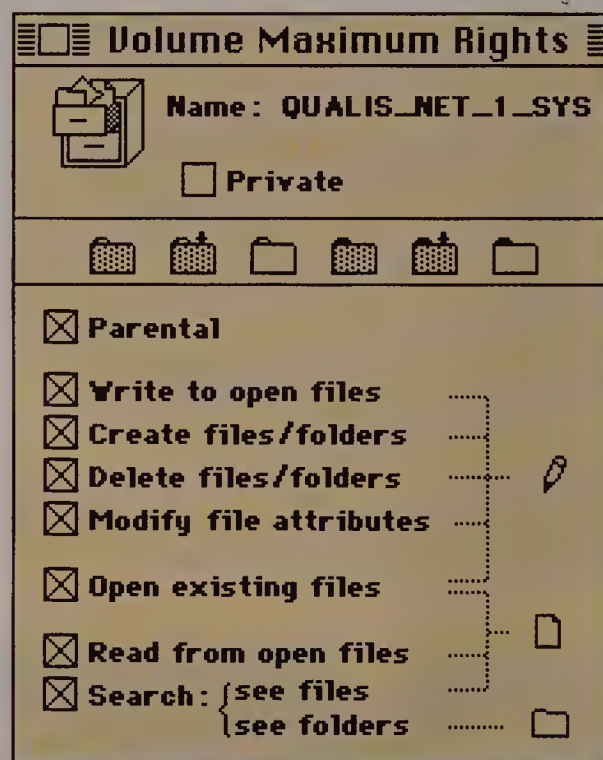
Once NetWare is loaded, you select it through the Chooser, like any other AppleShare server. User name and password are entered and NetWare's file cabinet icon appears.

The NetWare Control Center program is the beginning of Novell's goal to permit complete network management from the Mac. Currently the control center allows an administrator to easily assign trustee rights to directories and documents (a trustee is a user who has been given any rights to a folder). For example, with NetWare Control Center a manager can simply drag a user's name from a displayed list into the trustee list in a folder's rights window. Similarly, a manager can simply click on which rights to assign and revoke (see "Reading Your Rights").

The NetWare DA lets Mac users modify or view their own rights. While this DA doesn't seem to work across a bridge, it is an easy way to modify trustee rights. Those familiar with NetWare Rights or needing more options for trustees than AppleShare provides will probably use this DA rather than AppleShare's more limited Access Privileges/Get Privileges commands.

NetWare has more log-on security methods than AppleShare, such as defining account balances, permissible log-on times, and password expiration dates, as well as detecting intruders. Thus, a failed log-on attempt on a Mac may be due to an expired account although the user will be told it's due to an invalid password. A password longer than eight characters will prevent a Mac user from logging on.

One of the problems with this first version of NetWare for the Mac is that frequently, when an error dialog box appears, the Macintosh locks up.



Reading Your Rights

The NetWare Control Center's listing of access rights for folders on the server is more detailed than AppleShare's. This window shows the rights for a server called QUALIS_NET_1_SYS. A similar window can be displayed for any folder on the server.

Macs in a PC LAND

Following the AppleShare specs, NetWare truncates long Mac file names to the first eight characters. If a duplicate name ex- (continues)

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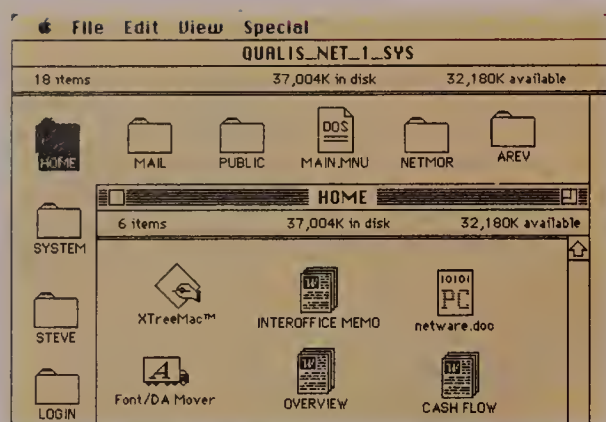
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Filing Away

Both Mac and DOS files on the NetWare server appear on a Mac user's desktop. In the window marked **HOME**, you can see typical Mac files (such as the three Microsoft Word files) as well as a DOS file named *netware.doc*. The folder labeled **SYSTEM** (in the rear window) is the server's system folder, not the typical Mac System Folder.

ists, it truncates the name to seven characters and appends a one digit count to the file name (MYFILEN1, for example). Users sharing files between the two operating environments should conform to the DOS naming convention. DOS users must use the NetWare utilities, like NCOPY as opposed to COPY, on shared files.

Another source of confusion is the "system folder" on a NetWare server. This folder is *not* the same as the System Folder on the Macintosh (see "Filing Away"). You should modify the permission settings of the NetWare server's system folder to prevent users from moving files into or out of it.

When working with a folder containing all DOS files, Mac users may notice a significant delay in viewing and closing the folder. Each Mac folder contains information beyond that needed for DOS systems, like the visual location of each icon, the file type, and the creator. On the initial Mac access, NetWare has to create this additional information for each item within the currently selected folder. This increases the server's work load substantially, so it's best to avoid folders with large numbers of PC files.

Why Use NetWare?

NetWare has many advanced features that invisibly apply to AppleShare. SFT NetWare is designed with four fault-tolerance features that complement AppleShare's features. Hot Fix reserves cylinders on the

disk drives for use in the event that bad spots develop on a disk. NetWare performs read-after-disk-write verification. If it finds errors, NetWare marks that spot bad and places the data into the reserved cylinders. NetWare's other two disk-fault-tolerant features are disk mirroring and disk duplexing (see "A Folder of File Servers," *Macworld*, January 1989). The backup power protection consists of an uninterrupted power supply connected to the file server through a serial link. In the event of a power failure, the server is notified and shut down without any disk data corruption.

One of NetWare for the Mac's advanced features is print spooling, which is faster than the Mac's background printing. Print jobs can be held, delayed, redirected, and purged. When you send a print job with downloadable fonts to the queue, the server will store these fonts for current and future use. When the print job is released to the laser printer, the fonts are retained in the file server and can be used by the next print job, reducing the amount of information that must be sent to the server. Thus the Mac spends less time printing. DOS workstations can also print to the same LaserWriter queue.

Backing Up the Network

The Mac's concept of file structure, with data forks and resource forks, is not used in PC operating systems. A Mac user cannot currently back up a server; this is the weakest aspect of NetWare for the Mac. Novell ships a utility called Macback, which can be used from a DOS workstation to back up only the Mac files on a server. Several vendors are working on systems capable of backing up both file formats in one utility. One product, Cheyenne Software's NetBack, does currently permit complete backup of NetWare servers from a DOS workstation. This is an inexpensive method of adding Mac support for those who already have NetWare servers.

If you're trying to pick a dedicated server for a network of only Macs, then AppleShare is your best choice. Even if you have a small network of both Macs and PCs, you're probably still better off using AppleShare rather than NetWare.

But, if the added security features (such as log-on times and disk space limits) appeal to you, or NetWare's laser printer spooling will reduce your network traffic, then NetWare for the Mac will provide you with the most complete networking package for Macs and PCs. The entry price is a bit steep, but all of NetWare's features may well help you sleep better at night.

—Steve Sanz

See Where to Buy or circle 780 on reader service card.



SMALLTALK/V MAC 1.0

Smalltalk Programming Language

Pros: Compact, efficient, practical implementation; superior documentation and tutorial.

Cons: Subset of the full language.

Company: Digitalk. **Requires:** Mac Plus; hard disk. **List price:** \$199.95.

OBJECTWORKS FOR SMALLTALK-80 2.3

Smalltalk Programming Language

Pros: Complete, definitive version from Smalltalk's originators. **Cons:** Too large for typical Macs; virtually demands previous Smalltalk background.

Company: ParcPlace. **Requires:** Mac Plus; 2MB RAM; hard disk; 4MB or more recommended. **List price:** \$995.



Years ago at Xerox PARC (Palo Alto Research Center), a young entrepreneur named Steven Jobs was shown a demonstration of the programming language Smalltalk running on one of Xerox's own workstations. What impressed him was the language's mouse-directed user interface, featuring movable windows, scroll bars, pop-up menus, and more. Later, a group inside Apple was organized to produce a mass-marketable computer featuring this amazing, intuitive graphical interface. The Mac, son of Lisa, was the result.

Although Smalltalk itself is the premier language for object-oriented programming, few pioneers envisioned it (continues)

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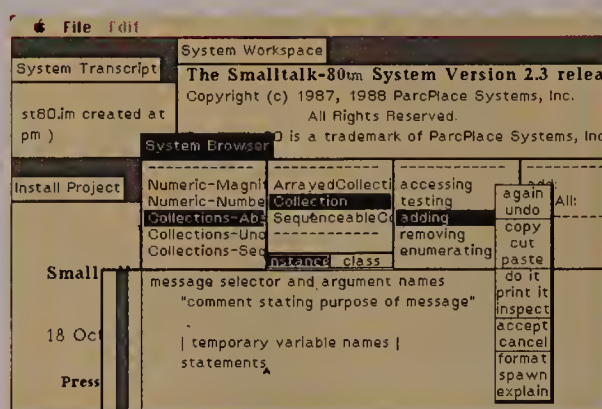
running on a personal computer (Xerox's version called for several megabytes of RAM at a time when memory upgrade meant taking a 48K Apple II up to 64K). Now, with multimegabyte Macs having become common, Smalltalk is finally available on the computer it inspired.

In languages such as Pascal or C, the programmer defines some data structures and makes a program from a list of procedures for data manipulation. In object-oriented Smalltalk, however, the *objects* that constitute data structures can be very complex (zoomable windows, rather than simple data lists) and the *methods* (analogous to procedures) that manipulate them become, along with the objects, part of the programmer's own extended version of the language. Objects with similar properties are further ordered into *classes*, and objects in *subclasses* can *inherit* properties. The key point in this scheme is that programming effort becomes reusable: methods designed to act on a given object can act on other objects in the same class and on objects in appropriate subclasses. Code reusability is one of the main reasons that object-oriented extensions of traditional languages are currently an area of intense commercial interest.

Smalltalk is furnished with such a large, rich set of classes and objects that programming a specific application is often simply a matter of writing a few lines of method code to manipulate existing objects. Smalltalk source code is the equivalent of five or six statements in Pascal or C. Furthermore, Smalltalk is remarkably friendly, despite the initial conceptual overhead, and it's one of the few languages with real entertainment value.

V, for Very Good

Smalltalk/V is the first serious attempt to deliver this development facility on a machine as humble as the Mac Plus. Digitalk's Smalltalk *image* (basically the machine-independent part of the language) fits in 600K of RAM, so it's usable in 1MB and workable for serious programming with 2MB. According to Kent Beck, of Apple's Vivarium project, this remarkable feat of compaction preserves about 80 percent of the functionality of the full (that is, Objectworks) version of the language.



Interface Archaeology

This is the interface that inspired the Mac, preserved in Smalltalk-80 just as it looked in (that's right) 1980. Objectworks for Smalltalk-80 is the street-legal version of Smalltalk; and ParcPlace, as the official custodian of the language, is justifiably interested in preserving absolute interface uniformity between Mac and workstation versions of the language.

Smalltalk/V also includes a lively interactive tutorial, an unusually helpful manual, a subset of Prolog for expert systems work, and a standard Mac interface. This last point, oddly, is somewhat controversial. The standard Smalltalk interface uses position- and context-dependent pop-up menus governed by a three-button mouse; Digitalk decided to change the interface to conform to a standard that most Mac users will consider an improvement in ease of use. Smalltalk/V Mac is compatible with Digitalk's IBM PC-based products, but applications developed in this environment would require retooling for use on UNIX workstation systems.

Talk's Not Always Cheap (or Small)

For \$995, ParcPlace (a company spun off from Xerox specifically to support and market Objectworks) will send you the "official" version of Smalltalk and an austere documentation set that will be most helpful if you have already used Smalltalk on a Sun or Apollo workstation. The minimum comfortable environment calls for 4MB of RAM, and you should have 5MB or 6MB of hard disk space available. The space isn't wasted, either; the library of classes in this version embodies most of the work ever done on Smalltalk. The ParcPlace staff includes many of the original Xerox developers of the language—ParcPlace president Adele Goldberg wrote the standard handbook for the language and its interface—so the Mac implementation

is designed to present exactly the same interface as workstation implementations, right down to unapologetic references to red, yellow, and blue mouse buttons.

Although Mac users will find that this interface takes considerable familiarization for easy use, virtually all published literature on the language corresponds exactly to what you find on the Objectworks screen. Thanks to an 85 percent academic discount, it's not surprising that this version of Smalltalk is favored by government agencies, universities, and decisions-systems programmers with significant contracts.

Two Variations

Smalltalk/V Mac is unquestionably the first Smalltalk "for the rest of us." Object-oriented languages will be a large part of the future of programming, and the Smalltalk/V tutorial is an exceptionally effective introduction. Most of the standard Smalltalk features that were omitted from Smalltalk/V can be coded as extensions and Smalltalk/V's conformation to the Mac interface will probably be welcomed.

Objectworks, in contrast, requires no extensions and accepts no deviations. It's not so much a Smalltalk for individuals as for organizations. ParcPlace offers support and training for entire campuses or corporations. Objectworks is the documented standard, with the advantages and limitations that role implies.

Both of these Smalltalk versions can be used to develop (with the cooperation of the respective language suppliers for run-time versions) reliable, deliverable applications for end users. Both offer friendly, interactive programming environments, with debuggers that operate at new, high levels of programmer-to-machine interaction. And they offer a perspective on programming that makes most other languages seem like boring variations on BASIC. If you have any sort of interest, not just in programming per se, but in what standard computing may become in a world of cheap memory and fast processors, you should contrive to get your hands on one of these implementations of Smalltalk.—Charles Seiter

See Where to Buy or circle 792 (Smalltalk/V) or 782 (Objectworks) on reader service card.

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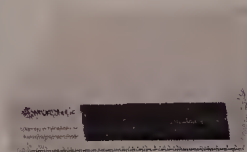
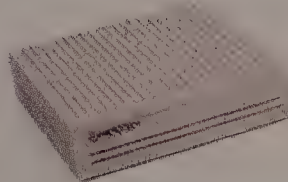
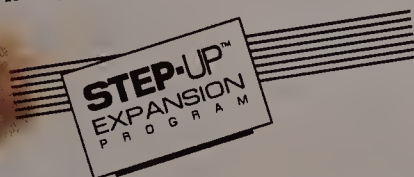
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THE PROFIT CENTER 1.0

Business Planning and Projections

Pros: Easy to use; clearly organized.

Cons: Inflexible reporting capabilities; some bugs.

Company: Tronsoft. **Requires:** Mac Plus; second disk drive. **List price:** \$695.



The Profit Center is a good place to start if you're considering becoming your own boss in a business where you have little or no experience. It gives you basic information, based on various averages, about what you can expect to make and spend. However, it's one thing to throw a bunch of numbers together and call it a business plan; it's another to compare those numbers with the realities of your marketplace. The Profit Center certainly can't replace sitting down with a competent professional who knows the business and the local market where you expect to launch your great enterprise—but it might just save you from some very costly mistakes.

Getting Down to Business

The program is straightforward and simple to use. You start by entering the name and location of your new enterprise. I called my potential money-maker Al's Big Burger and located it on a suburban strip in Anytown, U.S.A.

You select the type of business you want to start from a list of business types (if you can't find yours, there's a generic average business); the program then shows a breakdown of fixed and variable costs (see "Industry Ratios"). You then get a detailed breakdown of expenses and you can make any adjustments necessary. At this stage, professional advice can come in handy since there can be big differences between category averages provided by The Profit Center and your particular business.

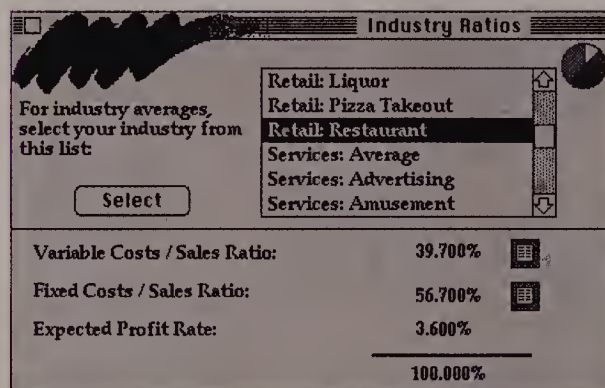
Next you create a sales forecast, either by specifying your expected profit or the number of units you will produce annually at an average unit price. Then it's time to enter start-up costs, and the fun of

entrepreneurship may begin to fade. By adjusting the numbers, or clicking on and dragging points of the graph that charted a monthly projection of my sales, I was quickly able to adjust the slope, my Ramp Up Curve, to reflect a slow start-up period for my burger business.

Next The Profit Center calculated my employees' wages, telling me how many people I should hire and at what rate of pay. After checking at my local bank, I completed the Loan Information screen and adjusted both the interest rate and terms of the loan to accurately reflect my bank's terms. That was it. I was ready to look at my results. Could I make it big in burgers?

The Good News and the Bad News

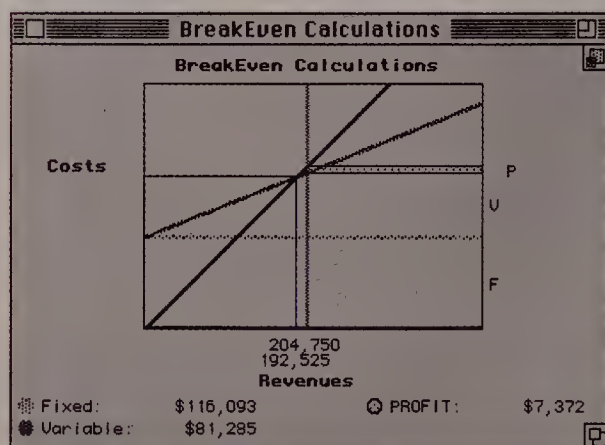
The program offers results in the form of both tables and graphics. You can analyze fixed costs, variable costs, cash flow, and break-even points (see "Breaking Into



Industry Ratios

The Profit Center helps you project your expenses based on average industry ratios for various businesses.

After you pick the industry that most closely resembles your prospective business, you may customize it on a separate screen.



Breaking Into Burgers

The program produces the BreakEven chart that breaks down your projected revenue into fixed expenses, variable expenses, and profit.

Burgers"). Mine didn't look bad. (They didn't look good, either, but at least I'm making money.) I had about \$19,000 in draw and profit to show for my first year of operation.

To top everything off, the program will print all the tables and graphs into a formal proposal that you can then take into a bank when applying for a loan. After the loan's approved and you sign your store lease, you can get Tronsoft's The Business Image, a HyperCard stack of logos you can use as a source of inspiration, to start designing your logo. Use their Capital Ideas to find financing when it's time to expand, and when you give it all up and decide it's time to work for someone else, you can use Franchise Finder to locate a likely franchise to invest in.

Start-up Problems

I was not entirely happy with the reports produced by the program, since I couldn't produce my projected cash flow in an annualized format or see the data in income statements or balance sheets. And there was no export facility to reformat the data in a spreadsheet.

Tronsoft also needs to get rid of some of The Profit Center's troublesome bugs. The word *debt* is misspelled in the Sales Breakdown report. The sections labeled in the table of contents were off by one page toward the end of the proposal report. When I reopened the program, all my customized cost data had reverted to the default setting, causing me a lot of extra work reentering data. And most annoying of all, my Mac SE kept bombing just after the program finished printing my proposal.

The Bottom Line

The Profit Center took a business about which I knew very little and gave me an idea of its viability. For \$695 it could help you avoid a mistake that could cost thousands of dollars. If it leads you into a successful business, the program will quickly pay for itself. Although no substitute for good advice and experience, it is a good starting place for discussing venture ideas with bankers and accountants.

—Alan L. Slay

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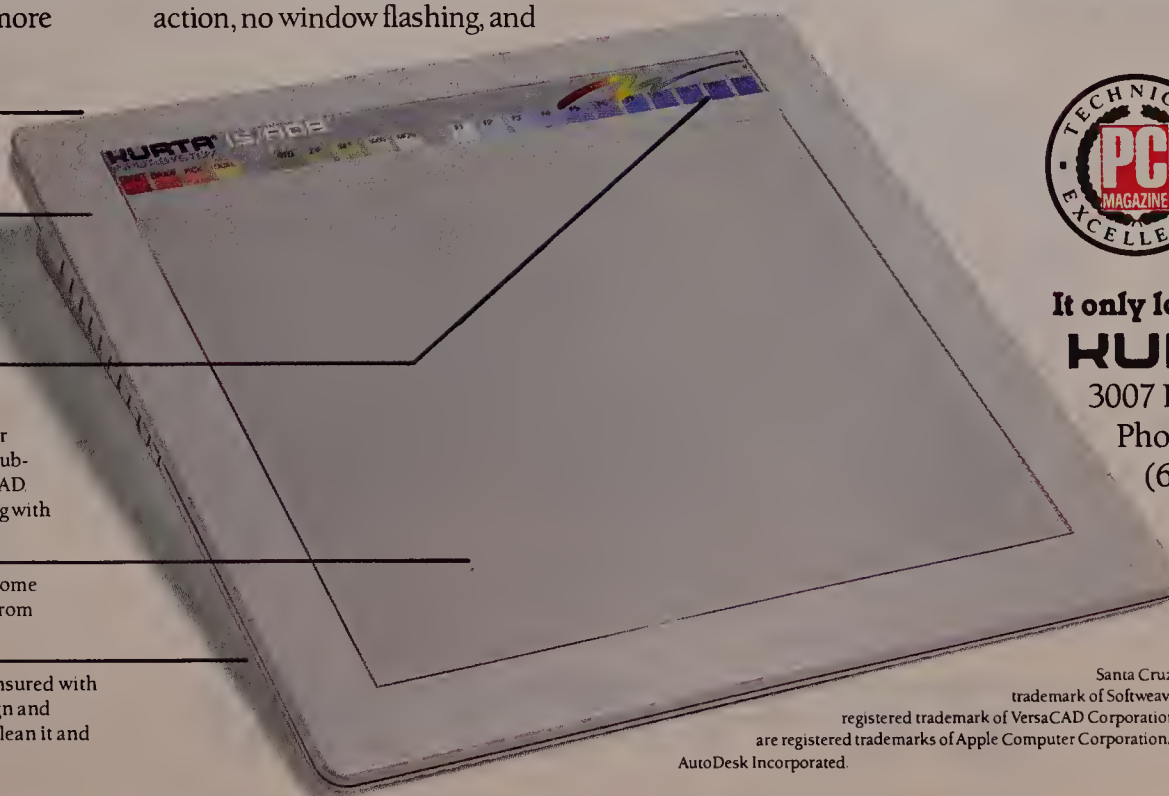
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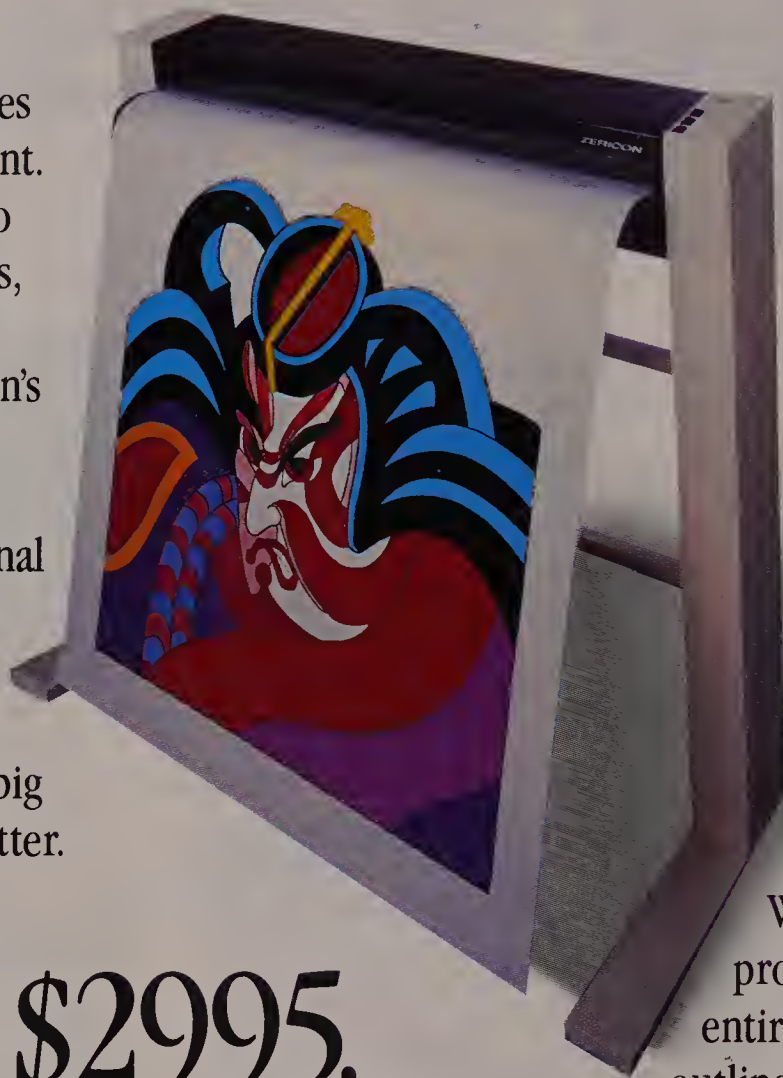
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Pros: Unlimited scrapbook files; visual table of contents; search capabilities; easy manipulation of scrapbook and clipboard graphics. **Cons:** None.

Company: Salutations International.

Requires: Mac Plus. **List price:** \$89.95.



Pens and pencils, staplers and staple removers, notepads, Post-it notes, paper clips, calculator, and pencil sharpener all make my life much easier. But I am careful not to let too many of these accessories overflow my desk lest they interfere with the main task at hand. I carry this philosophy over to the Mac's metaphorical desk accessories. Once I get near the limit of 15 DAs, I start getting rid of those I haven't used in a few months.

Among the most useful DAs I've found are those that take the originals a step beyond, like Calculator+ and Notepad+ (included in Borland International's SideKick). I've now added SmartScrap & The Clipper to my list of essentials. The package actually includes two separate DAs.

So Long, Old Scrapbook

SmartScrap, a replacement for the Mac's Scrapbook DA, allows you to have an unlimited number of scrapbook files, which can be stored on any disk (not just on the start-up disk). To find a particular graphic or block of text, you can use the visual table of contents that includes all the pages in miniature, search by a name (or part of a name) that you can attach to each page of the scrapbook, and switch scrapbooks.

When you choose SmartScrap from the Apple menu, the Scrapbook you had open last reopens to its first page. A SmartScrap menu appears on the menu bar. The SmartScrap window takes up the entire screen and includes scroll bars and the shrink icon. Clicking on a special icon in the lower left-hand corner moves you quickly to the next or previous page. Other icons on the bottom scroll bar enable you to switch between the marquee and the lasso and display the control

panel at the top of the window. From that control panel you can create and display a page name and the file's table of contents.

SmartScrap supplies MacPaint-like lasso and marquee tools that allow you to select only part of a graphic. If you want a selection from an object-oriented graphic to remain object-oriented, you must use the marquee tool. Anything you select with the lasso automatically becomes a bitmap when you copy it to the clipboard, even if it was originally part of an object-oriented PICT file.

To create a new scrapbook, you simply choose New Scrapbook from the SmartScrap menu. You then name the scrapbook and place it in the appropriate disk or folder. To add to the new scrapbook or to an existing one, you copy and paste the text or graphic just as you would with Apple's Scrapbook DA.

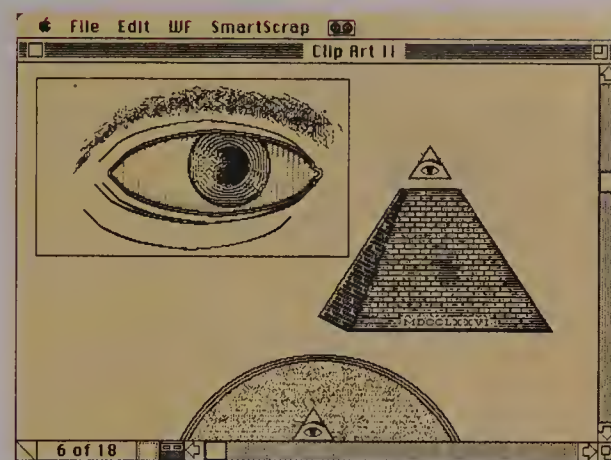
SmartScrap gives you the added option of printing an entire scrapbook, a single page, or a selected range of pages.

With ScrapMaker, a stand-alone utility program included in the package, you can automatically add entire MacPaint or MacDraw (PICT) files to an existing scrapbook or create a new scrapbook. You can add an entire folder of files at once or individually. ScrapMaker is easy and worked without a hitch when I created a new scrapbook using clip art. If you install SmartScrap & The Clipper and have Vaccine installed, however, Vaccine will notify you that there is an anomaly—The Clipper window. Remove Vaccine from your System Folder, place it on the desktop, restart your computer, install SmartScrap & The Clipper, and then replace Vaccine, and you should have no problem.

Getting a Perfect Fit

The Clipper DA allows you to perform precise manipulations of graphics that you've copied to the Mac's Clipboard. You must first copy something to the Clipboard, then select The Clipper from the Apple menu and paste into The Clipper's window. At this point The Clipper's window is transparent, enabling you to place it in the specific spot on an underlying page where you'd like the graphic to go.

The Clipper allows you to manipulate a picture by either scaling or trimming.



Picking Part of the Picture

SmartScrap allows you to select part of a graphic to paste into The Clipper or an application. Here the marquee tool was used to select a rectangular portion of the page. A lasso tool is also available for choosing irregularly shaped parts of graphics.

When you choose Show Contents from the menu, the graphic appears against the normal white background (you switch back to the transparent window whenever you like). To scale, you can simply choose Scale to Fit from the menu, and the graphic will fill the entire window. You can be more precise by choosing Scale from the menu; you choose the precise size of the graphic, in pixels, millimeters, picas, inches, or by using percentages of the original graphic. You can also scale each dimension (horizontal and vertical) individually, or scale just one dimension and let The Clipper automatically calculate the other dimension so that original proportions are maintained. Trimming works in a similar fashion: you can trim a graphic—cutting off one part of it—to fit The Clipper's window or manually choose coordinates for each of the four sides of the graphic.

Working with The Clipper requires some patience and practice, but it operates quickly and you can experiment endlessly on a particular graphic until you get it exactly the way you want.

SmartScrap & The Clipper take up about 77K of disk space. They support 256 colors on the Mac II, seem to be bug-free, and work well with Finder 6.1 and System 6.02. They also run flawlessly under MultiFinder.

These elegant DAs attack straightforward tasks efficiently and simply; I highly recommend them to anyone who uses graphics on the Mac.—Jeff Merron

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★ OVALTUNE 1.0

Graphics and Music Software

Pros: Excellent tutorial-oriented manual; wide variety of features and options; innovative user interface; supports color monitor and MIDI equipment.

Cons: Limited appeal; copy protected.

Company: Intelligent Music. **Requires:** Mac Plus. 2MB recommended. Requires System 6.0.2 for Mac SE or II. **List price:** \$145.



What can you say about a well-written, well-designed program that has a multitude of features (including sophisticated graphics and sound capabilities), an innovative user interface, excellent documentation—in short, one of the best-executed software products you've seen in quite a while—that still doesn't manage to capture your excitement? I find myself in just that dilemma with OvalTune from Intelligent Music. On the one hand, I want to rave about one of the finest pieces of software engineering I've ever seen. On the other hand, I wonder how many people are willing to lay down money for a software program that does nothing more than draw pictures (in color if you have a Mac II) and play funky music while you move the mouse. Because I'm of two minds, maybe a split review is best...

Gene: You know, Roger, when I first started using OvalTune, I didn't expect a whole lot. I figured it was just another play-music-with-your-mouse program that happened to create pictures as well. I wasn't prepared for a set of graphics functions rivaling some paint programs: shapes, patterns, colors, palettes, symmetry, color cycling, ink types (including matte and the various color inks), clipping, and so on. In fact, the first section of the manual—which, by the way, is one of the best I've ever used—focuses just on the graphics capabilities before really talking about how to make music.

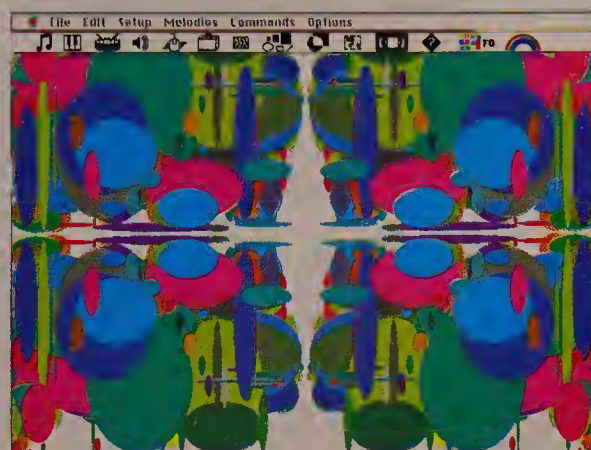
Roger: I appreciate your enthusiasm, Gene, but I don't share it. I found the program hard to get into. Unlike most Macintosh programs, OvalTune was neither obvious nor easy to use right off

the bat. Instead, I had to carefully work through the manual page by page to figure out how to use each feature. I'll admit the manual was well done, but it's frustrating to have to work so hard in order to do anything interesting.

Gene: Given the variety of features, it's not surprising that it takes a while to master OvalTune. Even so, the basic idea is simple: you move the mouse, and OvalTune draws images on the screen and plays music based on those mouse movements. And like the graphics, the music capabilities are surprising. OvalTune comes with a large number of sampled instruments and sounds. You can load multiple samples, assign them to different channels, and decide which channels are playing at a given time. You can adjust the mouse response so that movements affect velocity, duration, and melody sequence. You can set up rhythm patterns and have them play independently or synchronize them with your performance. And I could go on for some time about the user interface, with its use of mouse, keyboard, menus, pop-up windows.

Roger: Those are impressive features, Gene, but what about the music they produce? I may be old-fashioned, but most of the music sounded like Max Headroom playing New Wave rock. I thought it might have been my own lack of creativity, but the examples that came on the disk weren't much better. And it was also hard to get much volume out of the music unless I hooked up the external jack to my stereo.

Gene: Well, I can't vouch for your taste



Menu Bars

The OvalTune user interface offers both a standard menu bar and, below that, a command bar with drop-down boxes.

in music, but I did find that the music sounded great when hooked up to some MIDI equipment, for example a digital piano and a multitimbral orchestra box. OvalTune allows you to assign each of its 16 channels to either serial port or to a loaded sample sound so that you can use sampled sound and MIDI equipment simultaneously.

Roger: That's great—if you have MIDI equipment and a MIDI interface for your Mac. But the number of sampled sounds that can be played at the same time is constrained by the type of Mac you have, just as the number of samples you can load is constrained by memory.

Gene: On top of all this, OvalTune has a "videotape" facility that lets you record performances, save them to disk, and then play them back. You can record music and graphics separately or together, play them back separately or together, and have either or both playing while you are performing. I recorded one of my better performances so that I could play it back for my wife, and as the manual mentions, distribute it to others.

Roger: Yes, but Gene, your friends can't do anything with it unless they have OvalTune and all the same sampled sounds. In other words, it's not a self-contained performance but just a set of instructions for OvalTune. Though in all fairness I'll note that you can save just the music portion of a performance as a MIDI file that can be read by some other programs.

Gene: There's a lot more I could talk about, like keyboard input and presets, but I can see we're running out of time. OvalTune gets a thumbs-up from me for its all-around excellence in design, performance, and documentation.

Roger: And I'm afraid OvalTune gets a thumbs-down from me. I really wanted to like this program, but it took determination to work all the way through the manual, and I'll probably never use it again. While acknowledging Zicarelli's time and effort I still question how much demand there is for a software product like this, especially at \$145. But I guess that's what the marketplace is for. —Bruce Webster

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HYPE



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Unretouched screen displays of a television set displaying the output of a Mac II using a NuVista card with a VIDI/O Box, and an Apple RGB monitor displaying the same image.

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WINDOW SHOPPING

by Lawrence Stevens

MacProject II gets a new look this month. I also review programs that help you back up your hard disk, use MultiFinder even if you only have 1MB of RAM, and get skinny.

MacProject II 2.0

In my review of MacProject II from Claris Corporation (*Macworld*, August 1988), a major criticism was that the product didn't link resources and tasks closely enough. I complained that if you have one resource, say an employee, scheduled to work on two or more conflicting tasks, the program would show the conflict, but would not reschedule the project to relieve it. MacProject II version 2.0 corrects this shortcoming with resource leveling. You can assign a priority percentage—from 0 to 100—for each task. If a resource is scheduled to be used in conflicting tasks, the resource-leveling utility postpones some tasks, beginning with those that have the lowest priority ratings. If you select Interactive Leveling in the Preferences box, the program displays a dialog



box with three possible solutions for each conflict. You can choose to reschedule the task (MacProject suggests the best date), decrease the percent of effort by the resource (for example, decide to use an employee only half-time on each task), or substitute a different resource.

Unfortunately, version 2.0 doesn't correct my second major criticism: it uses a nonstandard schedule chart that can be difficult to read with complicated plans. There are a number of minor enhancements, however, that when added together, do make the chart easier to read. For example, critical path activities, which cannot be delayed without delaying the entire project, used to be displayed in bold. Now they also have a drop shadow, which makes them easier to pick out in the jumble of activity boxes. You can also view multiple charts and save that view so that you can recall the same combination

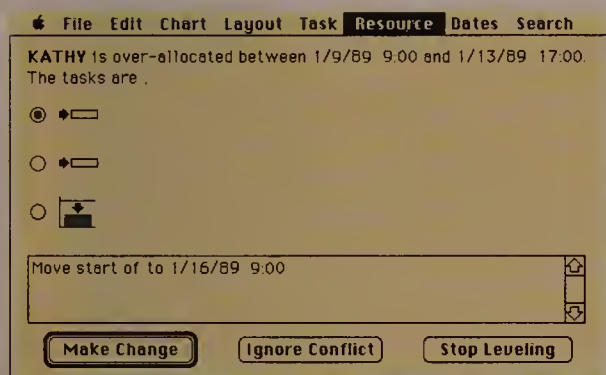
of windows later. In reduced mode, you can now cut, copy, paste, and add dependency activities. MacProject II 2.0 costs \$499; you can upgrade from version 1.0 for \$65 or from Apple's MacProject for \$199. If you purchased version 1.0 after February 1, 1989, contact Claris for upgrade information.

In my original review, I summarized the differences between MacProject II and Micro Planner Plus (the other Mac project planner) as being that MacProject II was easier to learn and use; while Micro Planner Plus had resource-leveling ability and more-readable charts. Now MacProject II has resource leveling; its schedule chart is at least slightly more legible; and it is even easier to use and learn with its spelling checker and HyperCard-based help screens.

MFLauncher II 1.0

If memory limitations keep you from running the applications you want under MultiFinder, MFLauncher II from Impossible Dreams Software (\$49.95, bundled with MFDetective 1.0) can help you better organize your RAM. The programs provide charts to show exactly how the Mac is using its memory. The main screen shows how much memory is available. You can use that number to determine if a particular application will fit in memory or decide how much memory to allocate to your applications.

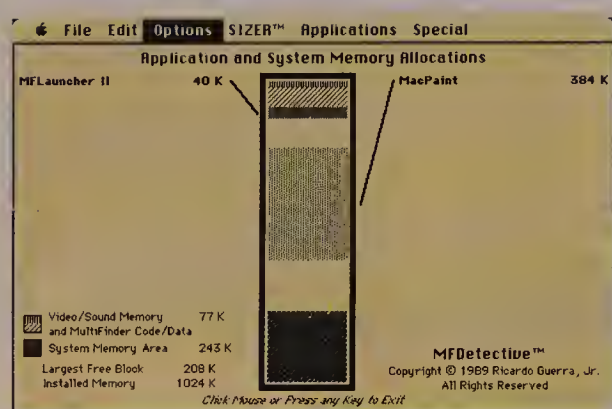
The MFDetective chart is especially helpful when the problem is not a lack of memory but fragmentation. For example, if you open three applications, each of which requires 250K of RAM, one after another (we'll call them A, B, and C) and then you quit applications A and C, you now have 500K of free space. But the free space is discontinuous, or fragmented, (continues)



MacProject II with Resource Leveling

If the same resources are in demand for several projects, you can resolve the conflict by using the interactive Level Resources dialog box. The program can suggest three ways to resolve the conflict: Make Change, Ignore Conflict, or Stop Leveling. The icon next to the two top radio buttons means reschedule the task, the third button means decrease the resources effort. As you click each radio button, a different solution appears at the bottom of the screen.

since application B stands between the two 250K areas of free space. You will not be able to open application D, which requires 500K of RAM because applications can only fit into continuous sections of free space. The solution is to quit application B and reopen it. That moves B up to the top of the memory ladder and combines the free space that had been on top of and below it into one continuous block of 500K. The MFDetective chart (see "Where Your Memory Is Going") displays the amount of free space and which applications have to be reopened to defragment. MFLauncher also helps you run MultiFinder by replacing the Finder, which uses about 160K of memory. The entire MFLauncher program uses only 40K of RAM. In return for saving 120K of memory, all you lose is the Finder's icon interface.



Where Your Memory Is Going

This MFDetective screen shows that although a total of about 390K of RAM is available, the memory is fragmented in one block of about 100K and another block of 208K. By quitting MacPaint and restarting it, MacPaint will move up next to MFLauncher, defragmenting the free space.

If you're trying to run MultiFinder with 1 megabyte of memory, MFLauncher is practically a must. If you have more memory but still sometimes find yourself squeezed, this can help.

HFS Backup 3.0

HFS Backup from Personal Computer Peripherals Corporation (\$99 upgrade from 2.0 or MacBottom \$35) is a hard disk backup utility that does all the things you would expect: it can back up and restore all files, selected files, or all modified files. But it also has some features not found in more basic backup software. For example,

it can back up by class (all applications, all documents, or all System files). Or it can back up all files created by a specific application; all files whose names start with, end with, or contain a pattern of characters; or all files modified before or after a given date.

Most backup programs fill the destination volume to capacity, which prevents modified files from replacing older versions of the files during subsequent backups. HFS Backup allows you to reserve a "pad" of blank disk space next to each file (from 0 percent to 500 percent of the file size) so that new files can overwrite the older ones.

The most unusual part of HFS Backup is its ability to create a single volume in Finder format out of a set of floppies. Other backup programs allow you to save large files on multiple disks, but they use a special format that prevents the files from being opened without first restoring them to the hard disk. With HFS Backup, you place the first floppy of the set into the drive, and a special disk icon appears on the Finder. When you open files from this set, the program allows you to insert the correct disks.

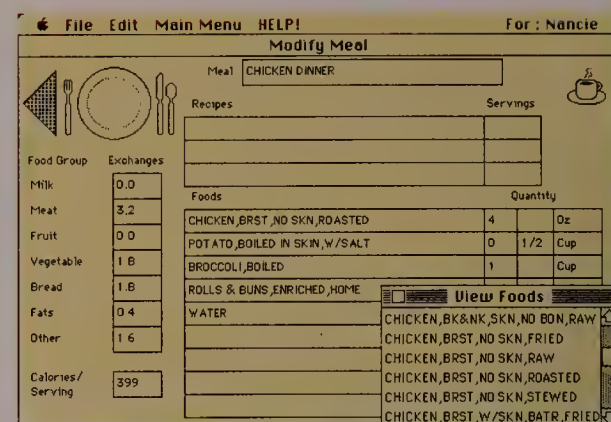
It's hard to think of anything that Personal Computer Peripherals has left out of its software. If you want a complete backup utility, HFS Backup has just about everything.

Two-Minute Nutrition Manager 1.0650

If you are really serious about tracking nutritional and caloric intake, the Two-Minute Nutrition Manager from DPEX (\$99) can help you design and track a weight-loss plan. Once you set up the system, it can, in fact, take only two minutes of your time every few days. Setup, however, can take hours, so it might not be worth the time if you only want to lose a few pounds.

You begin by inputting your height, weight, age, sex, and activity level. The program then displays an ideal weight. You type in the number of pounds you want to lose each week, and the program specifies the caloric intake broken down by food group (milk products, fruit, bread, and so on) required for that goal.

The program comes with a database of



Planning Nutritious Meals

To plan meals in the Two-Minute Nutrition Manager, you copy and paste the names of foods from the View Foods window into the Modify Meal window. As you do so, the program displays the total calories for the meal. If you double-click on any food name in the View Foods window, you get a screen that analyzes the food for 22 nutrients (a professional version of the program analyzes each food for 66 nutrients).

about 2000 foods analyzed for calories and nutrients. You use this list to create recipes and meals (see "Planning Nutritious Meals"). The program calculates the total nutritional and caloric value for the recipe or meal. Even with this help, the process of combining foods into a satisfying variety of low-calorie, nutritional meals can take hours.

The final step is to assign meals. As you do, the program displays the total daily caloric intake of those meals (broken down by food group) and compares the total intake with the goal. You can also specify meal preferences using a rating system. The program then automatically assigns meals based on preference.

The Two-Minute Nutrition Manager has some other nice features. For example, it provides charts to compare actual weight with the goal; it can generate a weekly shopping list; and it comes with a journal to help you analyze the food actually consumed during the week.

For about the cost of an initial consultation with a nutritionist, this program will help you set up a professional weight-loss plan. You'll have to put in some effort, and you'll miss out on human encouragement, but the Two-Minute Nutrition Manager might be just the ticket for the do-it-yourself dieter. **M**

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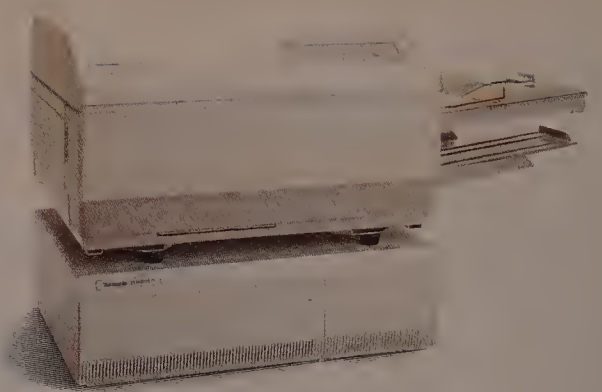
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NEW PRODUCTS

Edited by
Mary Margaret Lewis

This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.

HARDWARE

Color PostScript RIP

Raster image processor that lets film recorders produce slides from color PostScript files. Comes standard with AppleTalk, Centronics parallel and RS232 connectors, and 73 Adobe PostScript fonts. Compatible with 30286- and 30386-based MS-DOS computers as well as Macs. \$17,900. Agfa Matrix, 914/365-0190.

ColorView 5913

Plotter/printer with built-in rasterizer and 10MB of RAM. Provides 300-dots-per-inch resolution. \$13,995. CalComp, 714/821-2142.



ColorView 5913

GRI ProPlotter

Large-format pen plotter for desktop-CAD users. Produces D-size engineering drawings

(Size 4 architectural) and final drawings up to 22 inches by 34 inches on a variety of plotting media. \$1995. Gerard Research, 415/651-0217.



HP ScanJet Plus Output

HP ScanJet Plus

Eight-bit flatbed scanner with 256 levels of gray, 1500-dpi resolution, and Mac desk accessories. Lets you adjust output resolution to avoid moiré patterns. Includes interface bit for DOS. \$2190. Hewlett-Packard, 303/350-4444.

HyperBoard

Stand-alone data acquisition and process control board designed to extend functionality of HyperCard. Plugs in to the serial port, includes 32K RAM, and has on-board BASIC interpreter. \$139.95. HyperTrol, 303/938-1662.

MacConnect Model NIA310

Add-in board for the Mac II, IIfx, and IIfx. Acts as data link

controller for IEEE 802.3 Ethernet networks. Comes with software drivers for AppleTalk, DECnet, and TCPIP protocol. Provides for direct connection to an Ethernet network or to an external transceiver. \$549. Interlan, 508/263-9929.

MacSprint II

Cache card that increases the Macintosh II's performance by providing a 32K direct-mapped cache between the system main memory and the 68020 processor. \$299. Orchid Technology, 415/683-0300.

Maxi RD45 Series

Series of 45MB internal and external removable Winchester disk drives. Internal subsystem \$1325; external subsystem \$1625; Mac Plus/SE/II interface kit \$80. Sysgen, 408/263-4411.

Pixelink Monochrome Monitors

The 17-inch portrait monitor has resolution of up to 1280 by 1600 pixels; the 17-inch landscape monitor offers resolution of 1280 by 1024 pixels or 1600 by 1280 pixels; and the 20-inch landscape monitor offers resolution of up to 1600 by 1280 pixels. 17-inch portrait monitor \$1795; 17-inch landscape monitor \$1695; 20-inch landscape monitor \$1795. Pixelink, 508/562-4803.

Pronto

Cache card that functions as a SCSI host adapter. Works with any internal or external SCSI device, supports asynchronous and synchronous SCSI data transfers. \$745. Golden Triangle, 619/279-2100.

REO-650 Disk System

Removable, erasable optical 650MB disk system. Includes SCSI interface and software. \$5995. Pinnacle Micro, 714/472-0100.



REO-650 Disk System

Series II Twinax

Protocol converters that enable a Mac or an IBM PC connected to an IBM AS/400 to emulate an IBM 5251 or 5291 terminal. Multiport Series II Twinax with S/3xLink or IBM 5250 software \$1495-\$3595; single port series with software \$1195. KMW Systems, 512/338-3000.

(continues)

2400X Modem

2400-baud modem with dual RS-232C connectors. Hayes extended AT command set compatible; designed for synchronous and asynchronous communications; works with all microcomputers. Single unit \$295. Micro Electronic Technologies, 508/435-9057.

SOFTWARE**ACE**

Acts as a hard disk access manager with multilevel security; protects against known and future viruses. You customize security protocols and establish levels of security using passwords and encryption. \$279; 5-site pack \$895; 10-site pack \$1495. Casady & Greene, 408/624-8716.

AudioCad

Loudspeaker CAD application

that displays the frequency response of loudspeaker driver/box combinations you specify. Can overlay multiple plots. Has expandable driver library, and calculates vent and enclosure dimensions. \$95. Carvin, 619/747-1710.

**Blueprint****Blueprint**

Two-dimensional drafting package. Has layering, object-by-object color, autodimensioning, hierarchical symbol library, floating palette, and drawing tools. \$449. Diehl Graphsoft, 301/461-9488.

Cricket Color Paint

Color paint package with FreshPaint feature lets you treat any drawn shape as an object. Lets you save images as tools in a personalized tool palette and create custom color blends; contains a texture tool. \$295. Cricket Software, 215/251-9890.

**Cricket Color Paint****DiagramMaker**

Integrated graphics and text program for the production of drawings and presentation

graphics. Includes editable palette, object linking, background and foreground drawing, and the ability to keep connected objects joined when moving or resizing them. \$125. Action Software, 919/942-1111.

DiskLock

Utility that write-protects Macintosh hard disks, floppy disks, and hard disk partitions for data security as well as security against virus infection. \$45. GS Software, 703/860-5722.

Fusion

HyperCard card- and stack-management software. Merges all cards or a group of cards from one stack to another. Can also be used to delete a range of cards or entire stacks. \$24.95. Reliable Innovation Every Time, 612/537-8910.



With the new PaintJet color printer from Hewlett-Packard.

Look at the possibilities. Instead of basic black and a few dull shades of gray, look at the zip that color

adds to your graphs and charts. Overheads will command attention. And reports will have sparkling visual surprises tucked inside.

The PaintJet printer brings so much



HeartWood

Genealogical stackware designed to create and maintain information on a family using text, pictures, and voice. Automatically creates family trees from both an ancestor's and a descendant's point of view. \$65. HeartWood Software, 203/374-7481.

HyperComposer

HyperCard sound and music stack that lets you compose, edit, view, play, and print in two modes. Gives you the ability to import and export sounds for use in HyperCard stacks. \$69.95. Addison-Wesley, 617/944-3700.

HyperProject

Object-oriented project management software that allows eight windows to be open simultaneously. Windows may be various views of a single

project or several different projects. Supports full precedents diagramming, has customizable spreadsheet view and report generator, and incorporates simple CAD techniques. \$59.95. HyperProject, 213/722-8709.

InfoLogic Envelope

Envelope-printing software that lets you use fonts in all sizes and styles; prints directly on the envelope. Stores names and addresses in HyperCard stack. \$37. InfoLogic Software, 518/370-5510.

MacSearch

Software for researching available Mac software and associated prices. Also lists Macintosh trade shows, expositions, and seminars. Two-disk set. Subscriptions available. \$12 plus \$2 s/h. Master Manufacturing, 213/694-6861.

MacTracer

Ray-tracing software for generating three-dimensional images without having to build a model. Saves files in PICT or TIFF format. Has utilities for extrusion, auto-centering, wire-frame preview, hierarchical data structures, and surfaces of revolution. \$895. Ray Tracing Corporation, 512/328-0003.

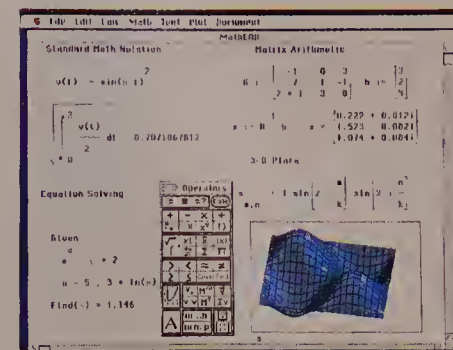
MacWisc-R

Software to help school psychologists analyze and generate hypotheses about students' performance on the Wechsler Intelligence Scale for Children—Revised. Lets you automatically graph scores. \$29.95. B.H.C. Publishing, 609/799-2061.

MathCAD

Based on PC version of MathCAD. Lets you define variables

and input text and formulas anywhere on the screen. Key computational features include comprehensive matrix arithmetic, trigonometric and inverse trig functions, hyperbolic functions, integrals, and derivatives. Does random number generation. \$495. MathSoft, 617/577-1017.



MathCAD

MFLauncher II with MFDetective

Finder replacement utility for use with MultiFinder. Comes with utility that gives graphic (continues)

Now you can milk your Macintosh for all it's worth.



to your work: 256 colors for the Macintosh II and 8 colors for the Macintosh SE. For just \$1,395. Plus \$125 for an interface kit that connects cleanly and simply.

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We invented IRMA™ to connect IBM® PCs and compatibles to mainframes. But when Macintoshes® arrived, our invention had to be reinvented. So out of IRMA technology, MacIRMA™ was born. With complete terminal emulation and file transfer functions. Plus IBM mainframe graphics and industry standard APIs. All of which should make it a necessity to add this to your DCA® file. **DCA®**

PC WEEK

DCA Enhances Mac-to-Mainframe Offering

New MacIRMA Emulation Board Includes Background File Transfer

By Tara Sexton

Digital Communications Associates Inc. (DCA) last week expanded its Macintosh-to-mainframe connectivity options with a new version of its MacIRMA 3270 terminal-emulation board.

The MacIRMA 1.2, which is compatible with the Apple Macintosh II, IIx, SE, SE/30 and Macintosh IIfx, announced last week, offers a wide range of new functions, including background file

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MacIRMA™



Best
Communications
Board

DCA Announces API for Mac Irma Card Users

Robert Snowden Jones

Digital Communications
Associates (DCA)

PC WEEK

Mac-to-Mainframe Connectivity

Using the Mac as a Front-End Processor to an IBM Host

Company's
financial
data

3270 coaxial
connection

MacIRMA board

Accesses
host-based
data and
generates
monthly
financial
reports

MacIRMA
API software

Using Digital Communications Associates' MacIRMA board and software tool kits from DCA and Apple, programmers can create custom applications in which the Mac serves as a front-end processor to the host. An application might, for example, let the Mac automatically collect host-based financial information to produce monthly financial reports. The Mac could access the host, compile it in a graphical format, and automatically send the report to a predetermined list of recipients.

DCA's Mac Irma Graphics permits users to access IBM mainframe graphics applications from the Mac II and Mac SE, cutting and pasting between those applications and Mac programs.

DCA Unveils Graphics Emulation for the Mac

Lets Users Access IBM Mainframe

BY LAURIE FLYNN

Mac users are no longer locked out of IBM mainframe graphics applications after last week's announcement of emulation software from DCA Inc.

The program, called Mac Irma Graphics, is used with DCA's Mac Irma card for the

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DCA/MacIRMA)



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display of the Macintosh's memory and shows where each open application is located. \$49.95. Impossible Dreams, 714/738-7752.

Multi-Ad Creator

Object-oriented page-layout software for the Mac that includes free rotation of grouped graphics and text, copyfitting, suggested layouts, and controlled duplication of objects. \$995. Multi-Ad Services, 309/692-1530.

NewsTrack

Public relations software for managing media lists and news clippings. Relational database can be used to compile data into reports and summaries using such criteria as average column inches per news clip or overall column inches. \$495. The Right Brain, 612/334-5620.



NME

NME

Sixteen-level arcade-style game that has you shooting NME robots while evading NME subcompact cars. \$19.95. Artific Software, 312/968-9406.

Order Desk

Mail-order database that accepts customer inquiries, takes orders, prints invoices and shipping labels, and performs search/sort operations on customer data so you can target specific groups. Can be used to create mailing lists and invoices. \$595. 4th Solutions, 408/736-4576.

PathFinder

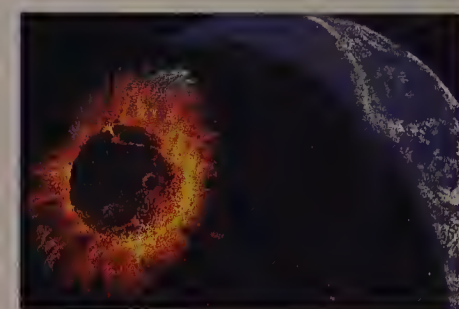
Stack-mapping utility for use with HyperCard. Runs in the background collecting information on your HyperCard session. Draws a map showing where you are and where you can go in the stack. \$59.95. Silk City Software, 203/228-0091.

Physician's Medical Database

Physician's office manager for individual or group practices. Based on Double Helix II. Includes 30-day, 60-day, and 90-day delinquency billing, complete and YTD patient records, welcome letters, and Medicare listings. Full version \$750; demo disk \$60. Datadyne Systems, 914/381-5704.

Picture Book

Utility DA that manages clippings from any application. Stores clippings in multiple scrapbooks; opens unlimited windows and cuts and pastes across them. Clipboard editor lets you resize and crop images before pasting. Prints scrapbook catalogs or selected clippings. 512K min. memory. \$49.95. Loop Software, 800/288-7631.



Picture Book

PicturePicture

Software that converts Lotus 1-2-3 or Symphony graph files into editable MacDraw PICT files. Compatible with various drafting programs. \$99.95. Carl Carlson, 602/628-7389.

Pro Plus Accounting

Accounting software designed for small to medium-size businesses. Contains general ledger, accounts receivable, accounts payable, inventory control, and payroll modules. Individual module \$350; set of all modules \$995. Pro Plus Software, 602/461-3296.

Real Estate Edge

Software to help real estate brokers and agents "farm" regions through mass mailings. Program contains a word processor; prints envelopes, mailing labels, and shipping labels; imports and exports files; stores history of mailings. \$295. Metropolis Software, 415/322-2001.

Real Estate Power of Attorney

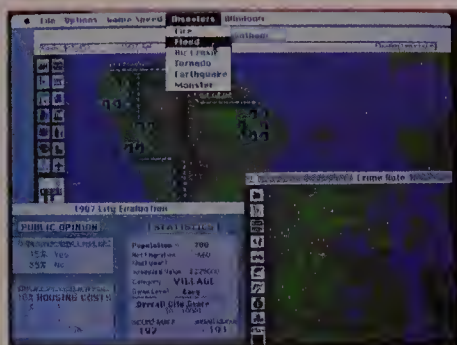
Word processor designed to create, edit, and print legal documents for real estate. Uses structured data-input method to read real estate documents and find all locations where client-specific information is needed. Prompts for appropriate information. 1MB min. memory. \$1495. Tronsoft, 805/564-3386.

Scheme Express

Implementation of LISP designed to operate like Lightship Software's MacScheme but lower in cost. Runs with 0.5MB of memory. 512K min. memory. \$69.95. Lightship Software, 503/643-6909.

SimCity

City planning simulation; creates a city in which you can zone land, balance budgets, install utilities, manipulate economic markets, and the like. 512K min. memory. \$49.95. Maxis Software, 415/376-6434.



SimCity

Stabilizer II Budget System

Budget system designed to stabilize cash flow by calculating a standard amount to save each month or pay period based on your expenses. \$25. Scott McGilliard, 1515 Arborview, Ann Arbor, MI 48103.

StickyBusiness

General-purpose labeling software for designing and printing labels, cards, and tags. Does measuring, calculating, and alignment of label forms in the printer. \$179.95. Williams & Macias, 800/752-4400 or 509/458-6312.



StickyBusiness

Synchronicity

Series of art screens that guide you through a personal-insight process based on the research of the psychologist Carl Jung and on *The Book of Changes*. You pose a question and the system produces a reflection or response. \$49.95. Visionary Software, 503/246-6200.

TeleFinder

Communications software with automated dialing, procedure (continues)

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■ Put the revolutionary BackPac on your Mac Plus or SE, and gain extra power and storage without losing portability. 20MB: \$649. 40MB: \$799. 80MB: \$1099. 100MB: \$1299.

■ The TalkBac 2400 Baud internal modem is Hayes AT-compatible, fits right into the back of the BackPac. \$199.

■ For reliable mass storage, the DirectOptical Drive features a removable, erasable cartridge with 300MB of storage on each side. \$4995.


■ Only 12 ounces and about the size of a mouse, the stand-alone TalkBac 2400 Baud modem gives you greater performance per pound. \$269.

■ For the capacity of a hard drive plus the convenience of a floppy drive, the MegaDrive removable media system lets you store 10 or 20MB

of data on a single, removable MegaFloppy disk. Awarded the 1988 World Class Award by Macworld. (20MB model shown at right.) 10MB: \$699. 20MB: \$999.

■ We can't show you the InnerDrive, since it's already installed inside this Mac II. And since it's incredibly quiet and 33% cooler than most other drives, chances are you won't notice it even when it's running. (Also available for the SE.) 40/SE: \$649, 40/II: \$649. 80/SE: \$949, 80/II: \$949. 100/SE: \$1099, 100/II: \$1099. 140/II: \$1499. (Mac II only.)

■ The DirectDrive XL free standing mass storage sub-system offers 1.4 gigabyte capacity and optional tape backup. Custom configurable and powerful enough for dozens of applications from CAD to LAN to desktop



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■ The DirectDrive Series gives you more than more megabytes for your money. They're thoroughly tested, incredibly fast, and come with 10MB of disk utilities and shareware. 20MB: \$549. 40MB: \$699. 80MB: \$999. 100MB: \$1199. 140MB: \$1499. 300MB: \$2795.

■ With the amazing DirectTape backup system, backing up data is as easy as it is fast. Provides 40MB of storage for a single user, or an entire network. \$899.



■ The DirectPrint 300-dpi printer is PostScript page description language-compatible and uses liquid crystal shutter technology for a superior printed image. 1989 Eddy Award winner. \$3495.



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It has often been said
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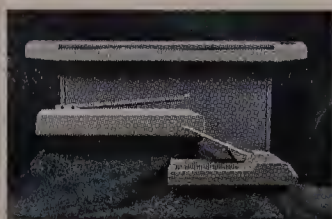


The Microtek MS-II
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Then instead of having to tedi-
ously retype reports,
financial statements
and other already
printed information,
you can quickly scan



The MS-II is just one member of a whole family
of innovative scanners available from Microtek.

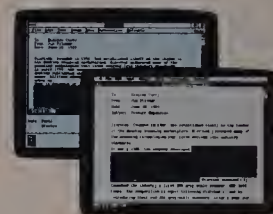


them into your word
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language, and online mail that supports text, graphics, and all Mac files. Text-driven communications compatible with MCI Mail and CompuServe. Uses proprietary TeleFinder protocol. \$145. Spider Island Software, 714/669-9260.

TestWorks

Test generation, test administration, and records management software. Program allows creation of roster of 100 student names with contact information and test scores. Exams are given using the Mac, and results are automatically updated in student roster. \$195. TestWorks, 714/859-0235.

Treacyfaces

Typeface collection for the Mac. TF Habitat and TF Forever are the first two font families of the series, in four weights each: roman,

italic, bold, and bold italics. Scalable to any size. Can be manipulated by a variety of page-layout and graphics-modification programs. 1MB min. memory. \$170 per four-weight package, including PostScript outline font file and bitmap screen-font set. Treacyfaces, 215/896-0860.



Treacyfaces

Vector

Engineering software devel-

opment tool for the Mac. Programming environment that allows creation of engineering application software. Includes 3-D CAD application. \$2595. MicroConcepts, 219/478-8088.

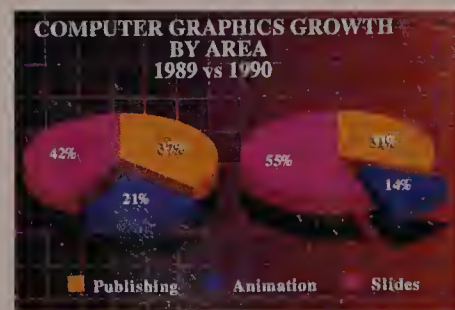
VersaCad Drafter

Two-dimensional CAD drafting program for mechanical and architectural designers. Has floating point accuracy to 16 decimal points of precision; unlimited visual symbol libraries. Edits, groups, dimensions, pans and zooms, grids and snaps, and cuts and pastes. 1MB min. memory. \$995. Versacad, 714/960-7720.

Visual Business No. 5

Presentation software that creates 2-D and 3-D charts and graphs with color-shaded backgrounds and a variety of text styles. Output Manager software rasterizer outputs to

any film recorder or to color printers. 1MB min. memory. \$295. Visual Business Systems, 201/327-2526.



Visual Business No. 5

Window Workshop

Disk with expandable application programs, MPW Tools, and MPW shell scripts related to the Mac II color window manager. Has an object-oriented customized ROM interface. \$20. Amplified Intelligence, 916/737-1550.

WordMaker

Word processor that gener-
(continues)

What's quick, convenient, and offers instant access?

RETRIEVER™ is the desk accessory that has software reviewers singing high praises: "...Retriever could easily become one of your favorite Mac utilities." (MacWorld, November 1988). Retriever offers you fast access to all Retriever database files while you are working in another program. You can selectively import/export data, sort on any field, or find/mark any information in the file. Retriever can make organizing your important lists (client contacts and addresses, parts lists, etc.) a whole lot easier.

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What's a word processor, and a mail merger, and a label printer and a...

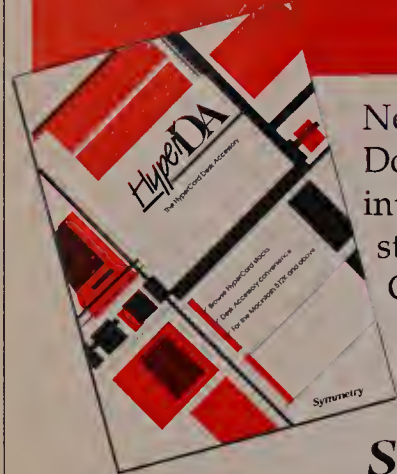
EXPRESSWRITE™ is the hardest working desk accessory for letters and correspondence. With features that read like a full-fledged word processing program — mail merge, glossary of standard paragraphs, customized envelope and label printing, complete font and style control — this DA is getting quite a reputation. "It has the most useful combination of features in a letter DA." (MacWEEK, March 14, 1989). You will be amazed by how many ways you can use ExpressWrite.

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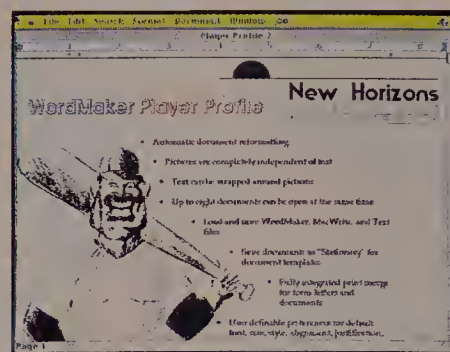
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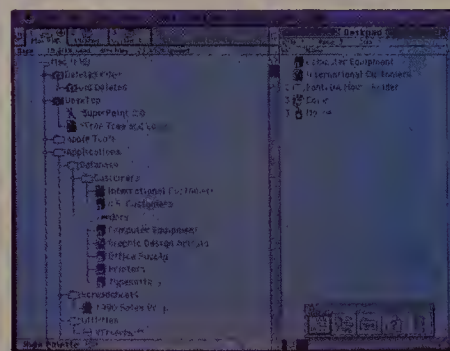
ates color output, wraps text around graphics, and opens up to eight documents at a time. Supports extended keyboards. Contains 1,000,000-word spelling checker and user-editable dictionary. 512KE min. memory. \$124.95. New Horizons Software, 512/328-6650.



WordMaker

Word Wrapper

Utility that transforms data from online services into files that can be formatted by Mac word processing programs. Converts hard carriage returns into spaces, recognizes paragraphs, and replaces designated number of spaces with tab characters. 512K min. memory. \$20. ITDC, 415/929-0924.



XTreeMac

XTreeMac

Integrated disk-management utility that uses graphics to represent files on disk in a tree display. Contains features to make files "invisible" for security protection, has undelete function, and provides Desktop work area where you may work with files without changing them. \$99. XTree Software, 805/541-0604.

ACCESSORIES

A Better Mouse Trap

Mouse storing pouch attaches to the side of the Mac with Velcro. \$8.95. Peri-Peripheral Company, 206/486-3003.

Le Shield


Computer screen filter made with Permamesh microweave fabric. Eliminates more than 85 percent of screen reflections and glare. Emissions barrier retracts for access to screen face. 13 sizes available. \$120 to \$175 depending on size. French Technology Press Office, 203/353-8578.

BOOKS & VIDEOS

HyperTalk

HyperTalk guide that is part of the Microsoft Press Programmer's Quick Reference Series. For new and seasoned HyperTalk script writers. More than 200 entries on syntax definitions, examples of common usage, and functional variances between versions of HyperTalk. \$5.95. Microsoft Press, 206/882-8080.

MIDI Programming for the Macintosh

Book for programmers and musicians with varying levels of programming and MIDI experience who want to write Mac music software using MIDI conventions. Book \$22.95; book and disk \$37.95. M&T Books, 415/366-3600. 

To have your product considered for inclusion in New Products, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, Macworld, 501 Second St., San Francisco, CA, 94107. We reserve the right to edit press releases.

The Story Of Apple® & Eve.™

In the beginning, there was an Apple. & a lot of software. Great stuff to use. Great stuff for pirates to copy free.

Then came a bigger, more powerful Apple called the Mac. The temptation for free software rose once more. & piracy again had its way.

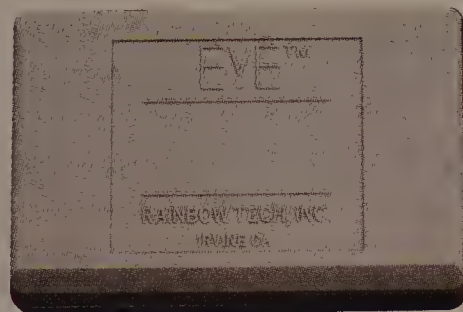
Then Eve arrived. To quickly end the free-loaders' rule. & the rest is history.

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EVE. The perfect companion to Mac software. For additional information, call Rainbow Technologies. European inquiries can be conveniently made to Rainbow Technologies Ltd, United Kingdom.

Rainbow Technologies also provides the SentinelPro and Sentinel-C hardware keys to protect software developed for IBM PCs, PS/2s and compatibles, and the Atari ST. And the DataSentry for PC users who want to protect data files.



RAINBOW TECHNOLOGIES

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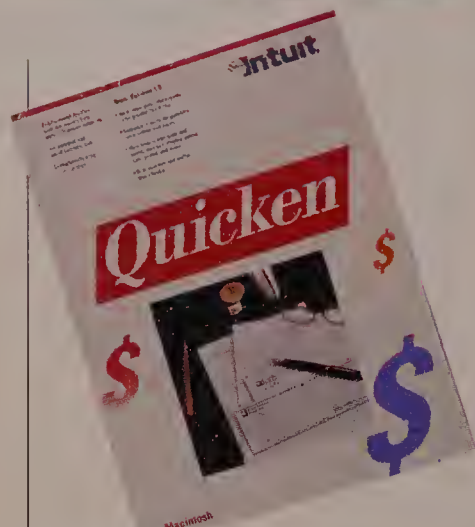
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HYPERWARE

Activision	
Focal Point II	119.
Reports for HyperCard	69.
Bantam	
Complete HyperCard Handbook	23.
Beacon Technologies	
HyperBible International Version ...	195.
HyperBible King James Version	159.
BrainPower	
ArchiText	179.
Bright Star Technology	
HyperAnimator	99.
HyperPress Publishing	
Script Expert	46.
ICOM Simulations	
HyperTMON	75.
MacroMind	
VideoWorks II HyperCard Driver	60.
MicroMaps	
HyperAtlas	64.
Power Up	
HyperTutor	29.
Silicon Beach	
SuperCard	135.
Springboard	
Family Matters	28.
Symmetry	
HyperDA	35.
TimeWorks	
HyperWorks Organizer	60.
Trendware Corporation	
HyperTools #1 or #2	ea 59.
Stack Cleaner	29.

UTILITIES

Affinity	
Tempo II	89.
ASD Software, Inc.	
FileGuard	129.
Berkeley System Design, Inc.	
Stepping Out II	52.
CE Software	
DiskTop 3.0.2	27.
QuickKeys (macro programmer)	52.
Caere	
OmniPage 1.0	559.
Central Point Software	
Copy II Mac (with MacTools)	20.
PC Tools Deluxe For Mac	45.
Design Software	
MacTree Plus	46.
Emerald City Software	
Lasertalk 1.0	187.
Fifth Generation	
FastBack II	109.
PowerStation	32.
Pyro	15.
Suitcase II	45.
HJC Software, Inc.	
Virex	69.
ICOM Simulations	
On Cue	36.
Insight Development	
MacPrint	79.
Kent Marsh	
MacSafe or NightWatch	ea 87.
LaCie Ltd.	
SilverServer	89.
Magic Software	
AutoSave II	29.
POWERICONS	39.
POWERmenus	39.



Word 4.0 (Microsoft)

Latest version of the best-selling document processing program. Complete WYSIWYZ editing, powerful customizing features. Create newsletters with multiple columns. Tabs are a breeze. Tell Word how many rows and columns, and it generates your table with automatic text wraps within cells. Word also has a spelling checker, hyphenation, style sheets, a glossary, automatic indexing, mail merge and much more. (word processors) **\$255.**

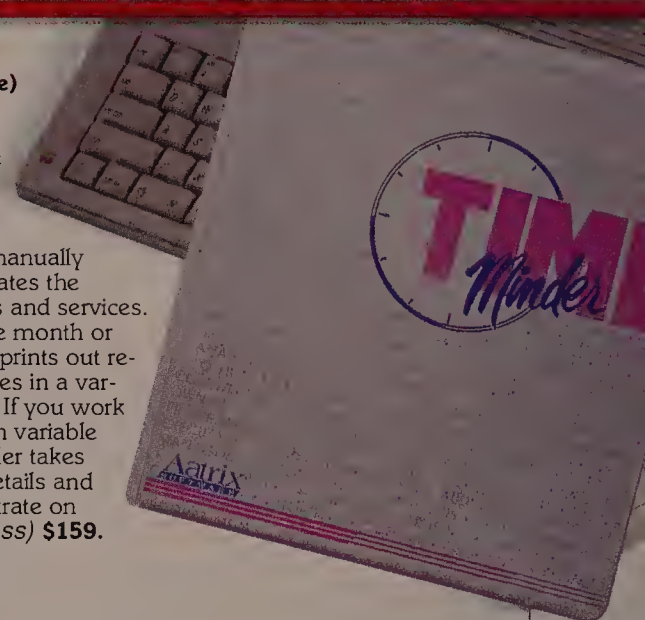
Mainstay	
AntiToxin	65.
Capture	42.
TypeNow	27.

MacSnap Memory Upgrades (Dove)

1 Meg surface mount CMOS SIMMS for the Macintosh Plus, SE and Mac II. Expand your Plus or SE to 256K using **MacSnap 2S**. Preserves future expandability. **Only \$399.** For maximum memory in the Plus and SE, or a 4 meg expansion for the Mac II, the **MacSnap 4S** utilizes state of the art low profile 1 Meg surface mount CMOS SIMMS. **Only \$798.** The **MacSnap 8S** expands the Mac II to 8 Megs for the Ultimate in power and memory. **Only \$1596.** **MacSnap 256K** surface mount products are also available for the SE and Plus Included with each MacSnap product is the high-performance Ram Snap software utility. (memory up-grades)

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Microlytics	
GOfer	43.
Olduvai	
ClipShare	99.
FontShare	149.
MultiClip	36.
PCPC	
HFS Backup 3.0	54.
SuperMac	
DiskFit 1.5 or SuperSpool 5.0	ea 53.
Sentinel 2.0	89.
SuperLaserSpool 2.0	79.
Symantec Corporation	
S. A. M.	69.
Symantec Utilities for Macintosh	65.
XTree Company	
XTree Mac	52.

DESK ACCESSORIES

Affinity	
AffiniFile	46.
Casady & Greene	
QuickDEX	32.
Exodus Software	
ExpressWrite	65.
Retriever	59.
Preferred Publishers	
DAtabase	75.
Vantage	59.
Solutions	
SmartScrap & The Clipper 2.0	46.
TENpointO	
Open IT!	49.

LANGUAGES

Digitalk, Inc.	
Smalltalk/V MAC	139.
Manx Software Systems	
Aztec C or Unitools	ea 65.
Aztec C+SDB or C+MPW	ea 99.

Pixel Paint 2.0 (SuperMac)

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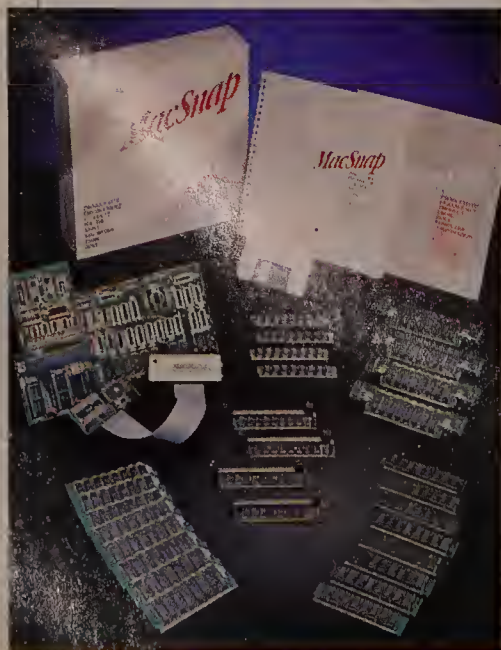
Microsoft	
QuickBasic	65.
SmethersBarnes	
Prototyper	149.
Symantec	
CAPP's Lightspeed C or Pascal	49.
Lightspeed C 3.0	169.
Lightspeed Pascal	95.
Zedcor	
ZBasic 5.0	99.

COMMUNICATIONS

CE Software	
QuickMail 2.0	205.
CompuServe	
CompuServe Navigator	45.
DataVIZ	
MacLink Plus w/Cable 3.0	139.
FreeSoft	
Red Ryder 10.3	54.
Hayes	
Smartcom II 3.1	88.
InSignia Solutions	
Soft PC (Mac II)	249.
Lamir	
Acknowledge	329.
Software Ventures	
Microphone III	225.
Solutions	
BackFAX(req. Apple Fax modem) ..	127.
Traveling Software	
Lap-Link	83.

DATABASE SOFTWARE

Acius	
4th Dimension	389.
AEC Management Systems	
AEC Information Manager	115.



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dBase Mac	295.
Claris	
FileMaker II	229.
Fox Software	
FoxBASE+/Mac	265.
Odesta	
Double Helix II	339.
GeoQuery	199.
ProVUE	
Panorama	205.

BUSINESS SOFTWARE

Access Technology	
Trapeze 2.1	149.
AEC Management Systems	
FastTrack Schedule	115.
Aldus	
Persuasion 1.0	385.
Ashton-Tate	
Full Impact	249.
BreakThrough Productions	
Market Master R/A	245.
Claris	
MacProject II	379.
SmartForm Designer w/Assistant ..	309.
Cognition Technology	
MacSMARTS PRO	249.
Cricket	
Cricket Graph 1.3	115.
Cricket Presents	289.
HyperPress Publishing	
Intelligent Developer	249.
Informix	
WingZ	269.
MetaComet	
Accu-Weather Forecaster	59.



WordFinder 2.0 (Microlytics)

WordFinder is a thesaurus program that helps you find the best words to express your best thoughts. Quickly. Since it's a desk accessory, it works with almost any Mac application. Designed for the modern business user and writer. (spelling) \$33.

Microsoft	
Excel 2.2	255.
PowerPoint 2.1	255.
Works 2.0	189.
Nolo Press	
For the Record	29.
WillMaker	32.
Power Up	
FastForms! Construction Kit	89.
Satori	
Bulk Mailer 3.3	79.
Softview	
FormSet	55.
MacInUse	42.
Symantec	
More II 2.01	255.
Symmetry	
KeyPlan	339.
Synex	
Mac Envelope 4.1	59.
Vertical Solutions	
FastLabel	49.



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WORD PROCESSORS AND OUTLINERS

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MindWrite 2.1	95.
Ashton-Tate	
FullWrite Professional	269.
Claris	
MacWrite II	239.
Microsoft	
Word 4	255.
Write 1.0	85.
Niles & Associates	
End Note	82.
Symmetry	
Acta Advantage w/DA	65.
T/Maker	
WriteNow 2.0	119.
WordPerfect Corp.	
WordPerfect	185.
Working Software	
QuickLetter	75.

SPELLING CHECKERS

Aegis Development, Inc.	
Doug Clapp's Word Tools	42.
Deneba Software	
Big Thesaurus	54.
Spelling Coach Pro	105.
Electronic Arts	
Thunder II	52.
Microlytics	
Word Finder 2.0	33.
Sensible Software	
BookEnds or Sensible Grammar ea	53.

GRAPHICS

3G Graphics	
Images w/Impact	
Graphics & Symbols 1	59.
Business 1	69.
Aegis Development, Inc.	
Showcase F/X	199.

Aldus	
Freehand 2.0	349.
Broderbund	
Drawing Table	76.
PosterMaker Plus	35.
Casady & Greene	
Vivid Impressions Vol. 1	69.
Claris	
MacDraw II 2.0	309.
MacPaint 2.0	99.
Cricket	
Cricket Color Paint	179.
Cricket Draw	168.
Cricket Paint	99.
Deneba	
Canvas 2.0	159.
Dream Maker	
Cliptures, Business Images	95.
MacGallery	27.
Electronic Arts	
Studio/1	109.
Studio/8	319.
MacroMind	
MacroMind Director	479.
VideoWorks II	199.
Miles	
Mac The Knife (All Volumes)	32.
Multi Ad Services	
ProArt: Bus., Sports or Holidays ea	95.
ProArt: Trilogy CD format	229.
NuEquation	
NuPaint	99.
Olduvai	
Art Clips	59.
Paracomp	
Swivel 3D	289.
Silicon Beach	
Digital Darkroom	259.
Super 3D 2.0	325.
SuperPaint 2.0	129.
SuperMac	
PixelPaint 2.0	199.

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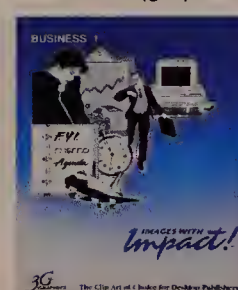
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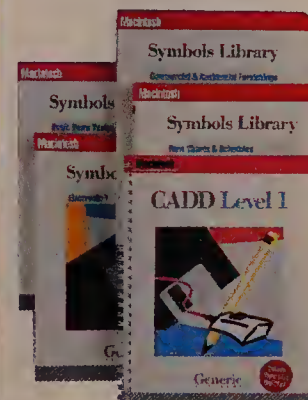
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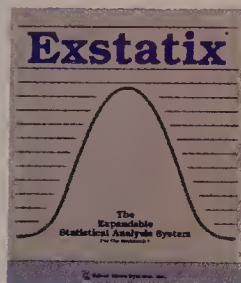
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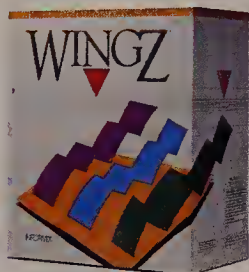


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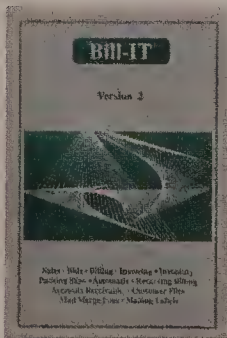
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Zedcor

Desktop 2.0 69.

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Illustrator 88 299.

Streamline 239.

Aldus

PageMaker 3.01 389.

Broderbund

DTP Advisor 47.

Emerald City Software

Smart Art I—Text Effects 89.

Icom Simulations

Mackern 119.

Letraset

ImageStudio or Ready,Set,Go! 275.

Olduvai

Read-It! 2.0 (OCR) 249.

Read-It! Personal 99.

Quark

Xpress 499.

Springboard

Springboard Publisher 109.

U.S. MicroLabs, Inc.

FontSizer 79.



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Connect Inc.

MacNet 43.

Farallon

Timbuku 2.0.1 65.

TOPS

TOPS 2.1 149.

Full Line Available Call.

Fonts

Adobe

Fonts (All Avail.) Call.

Forms and Schedules 299.

Presentations 299.

Altsys

Fontastic Plus 2.02 52.

KeyMaster 52.

Beyond, Inc.

MenuFonts 2.02 29.

Letraset

LetraStudio 289.

LetraFonts (various) ea 69.

Olduvai

ArtFonts Vol.1 or 2 55.

Orange Micro

Alphabits 69.

CAD/CAM

Claris

ClarisCAD 629.

Generic Software

Generic CADD Level 1 85.

Graphsoft

Blueprint 349.

MiniCad Plus 519.

Innovative Data

MacDraft 145.

Dreams 275.

FINANCIAL AND ACCOUNTING SOFTWARE

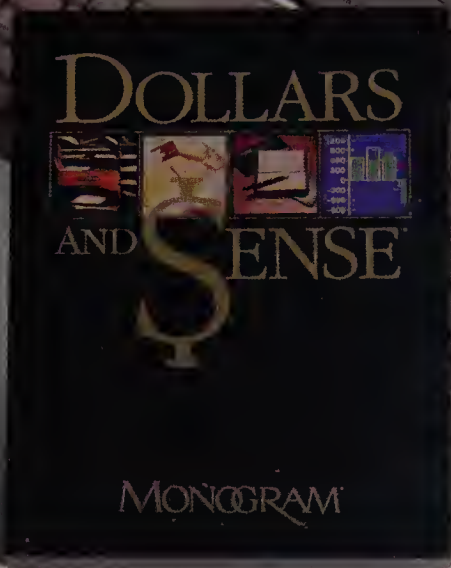
Aatrix

Checkwriter 20.

Payroll 3.5 99.

Dollars and Sense (Monogram)

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Odesta

Data Desk Professional 289.

Paracom

Milo 159.

Select Micro Systems, Inc.

Exstatix 219.

Wolfram Research

Mathematica (SE) 450.

MUSIC AND SOUND

Altech

MIDI Interface 59.

MIDI Basic 30.

Bogas Productions

Super Studio Session 2.0 75.

Coda

MacDrums 32.

Perceive 52.

Electronic Arts

Deluxe Music Construction 2.5 84.

Esthetic Engineering

Music Mouse 49.

Farallon Computing

MacRecorder (records sound) 135.

Graphic Notes

Music Publisher 375.

Impulse

Audio Digitizer w/SoundWave 139.

Passport Designs

Master Tracks Pro 3.0 259.

NoteWriter 189.

Resonate

Listen 2.0 62.

EDUCATIONAL/ PERSONAL

BrightStar

Talking Tiles 69.

Bootware Software

ResumeWriter Pro 75.

Davidson

Math Blaster 27.

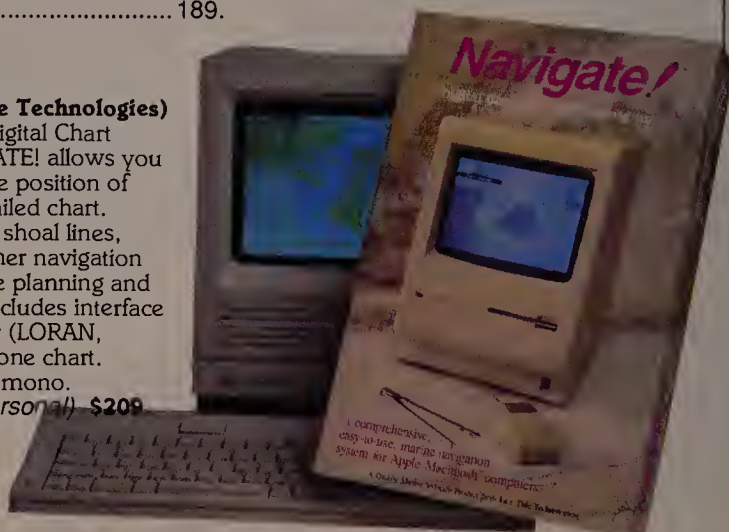
Speed Reader II 36.

Fair Tide Technologies

Navigate! 209.

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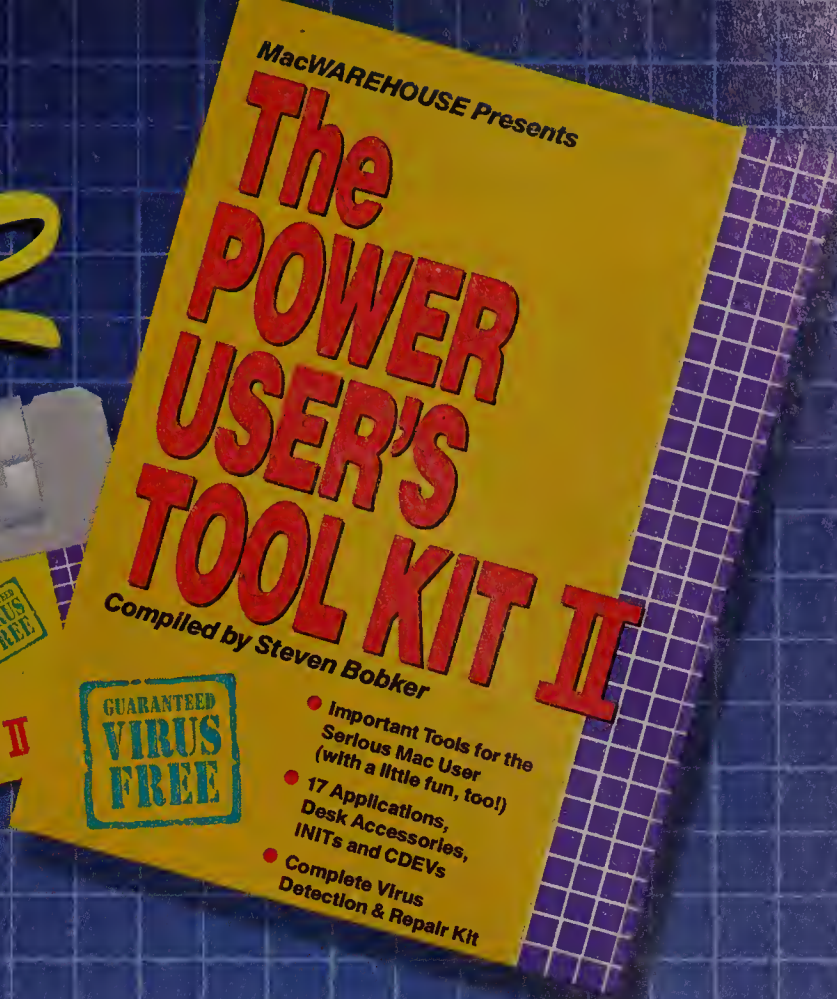


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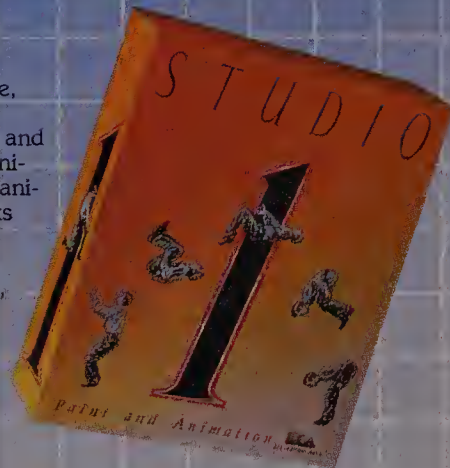
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HyperPress Publishing
Silver Screen 42.
Miles Computing
Puzzle Gallery 27.
Mindscape
Balance of Power, Deja Vu ea 30.
Nemesia
Go Master 49.
Joseki Tutor 30.
PCAI
Lunar Rescue 34.
MacGolf 2.0 35.
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Spectrum HoloByte
Falcon 2.0 32.
PT109 or Gato ea 26.
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Ancient Art of War At Sea 27.
Shufflepuck Cafe 24.
Where in the World is Carmen 27.
Bullseye
Ferrari Grand Prix or P51 ea 32.
Centron Software, Inc.
BlackJack or CrapsMaster ea 27.
CasinoMaster (5 pack) 49.
Discovery Software
Arkanoid 27.
Electronic Arts
Starfleet I: The War Begins 36.
Chuck Yeager Adv. Flight Trainer ... 32.

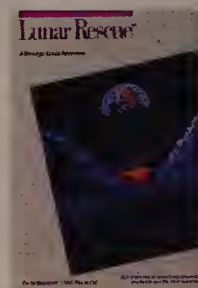


DailyDouble HorseRacing
Spend a day at the race track. Histories of nearly 400 races. 1 to 4 players. **\$19.**

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Arkanoid
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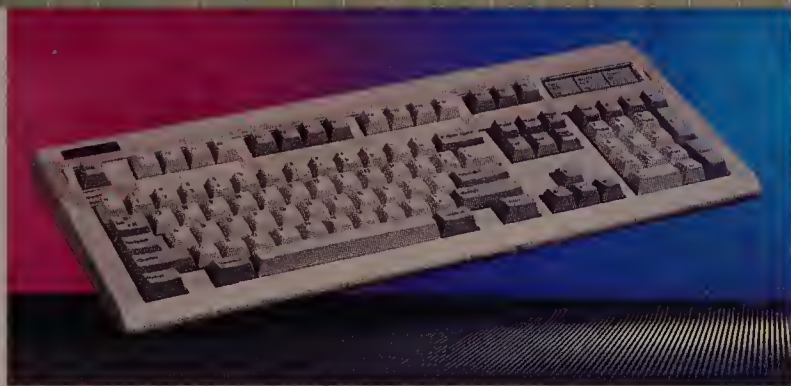
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Dayna File Dual 360K (5 1/4") 1.44M (3.5") 669.
Dolphin Systems Tech
Integra 20 Meg 549.
Integra 30 Meg 599.
Integra 40 Meg 769.
Integra 60 Meg 819.
Integra 80 Meg 1179.
Flipper 150 Meg Tape Backup ... 1439.
Flipper Removable 44 Meg 1195.

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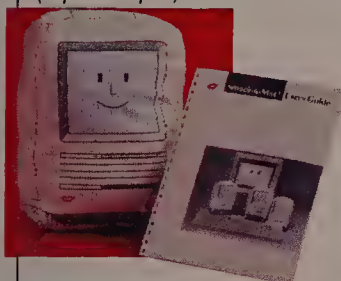


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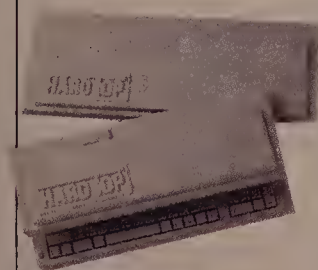
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Stressed out by your computer? Get relief with Smack-a-Mac. Poke it...Punch it... Pick it up and throw it... or if your Mac is behaving well smack it with a kiss. Comes with users guide. (accessories) \$9.



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3.5 Int. Drive Kit	99.
Quantum	
Quantum 40 MB Raw Drive	545.
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MODEMS

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Best Data Products	
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EPIC Technology	
2400II Internal Modem	315.
Hayes	
Smartmodem 1200	299.
Smartmodem 2400	449.
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Prometheus	
ProModem 2400 SE Int.	209.
Promodem 2400M	199.
Supra	
Supra Modem 2400	149.
US Robotics	
Courier Modems	Call.

BLANK MEDIA

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DS/DD (box of 10)	15.
Sony	
DS/DD (box of 10)	16.

INPUT/OUTPUT

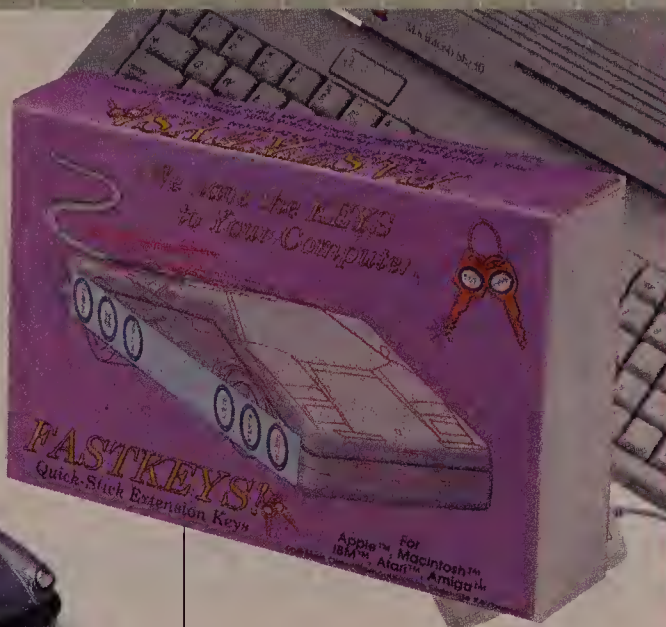
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Half-Page Scanner	379.
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Mac 101 Keyboards	145.
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New Turbo Mouse	109.
Koala	
MacVision 2.0	219.
Kraft	
ADB Joystick Premium III (SE&II) ...	51.
Kurta	
IS/ADB Tablet	259.
Cordless 4 Button Cursor	65.
Mouse Systems	
A+ Mouse (512/Plus or SE/II)	Call.
Seikosha America	
Seikosha Printer (dot-matrix)	235.
Summagraphics	
Bit Pad Plus	325.
ThunderWare	
LightningScan	409.
ThunderScan 5.0	189.

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Basic Needs

Hard Top Keyboard	15.
Hard Top Imagewriter	17.
Nylon Ripstop Dust Covers	14.
Utility Pac	11.
Computer Friends, Inc.	
MacInker (IW & IW II)	41.



Dolphin Subsystems (Dolphin Systems Tech.)

The intelligent choice for Apple Macintosh mass storage. **Integra** Zero footprint external hard drives from 20mb-100mb capacity. **Flipper 44mb** removable hard disk high performance (25ms) offers unlimited storage and convenient portability. **Flipper 150mb** high speed SCSI tape with FilexFile/Image Backup. (disk drives) see line listings for prices.

Curtis

Disk Holder (holds 40)	9.
Jewel Surge Suppressors	
Free Curtis Clip with purchase	Call.

Ergotron

MacTilt-SE	68.
MacTilt II-RGB	75.

Goldstein & Blair

The Macintosh Bible	20.
---------------------------	-----

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ImageWare II Carrying Case	49.
Macinware IIcx Carrying Case	89.
Macinware Mac II Carrying Case	99.
Macinware Plus Carrying Case	64.
Macinware SE Carrying Case	75.
Monitorware Apple RGB Case	79.

Kensington

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Apple Security Kit	34.
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MasterPiece Mac II	105.
System Saver	64.

Mobius Products

Fanny Mac QT	60.
SE Silencer	39.

Orange Micro

Grappler L/Q or LS	103.
--------------------------	------

Smack-a-Mac

Smack-a-Mac	9.
-------------------	----

SoundSight

FastKeys	39.
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Quick Tips

Illegible screen

fonts, fractions in

FileMaker, printers

abroad, and more

by **Lon Poole**

As I reported three months ago, you can hide a numeric value on an Excel 1.5 spreadsheet by setting the numeric format of its cell to a semicolon. What about hiding text? Geoff Wood of Stockport, England, suggests you select the cells whose values you want to hide, choose Number from Excel's Format menu, type **[White]**—that's the word *White* enclosed in square brackets—and press Return. That format writes characters in white "ink" to hide any value—text or numeric. The only values it won't hide are Excel's error values, such as #NAME? and #DIV/0!.

Wood notes that there are other ways of hiding cells; for example, you can hide a column by setting its width to 0. Or use the following macro to move the worksheet window off the screen:

```
HideTopWindow
=MOVE(-GET.WINDOW(5),0)
=RETURN
```

To move the window back, change the Move command to **MOVE(0,0)**.

GLOBAL PRINTER POWER

A U.S.-model ImageWriter II or ImageWriter LQ printer will work with an appropriate transformer in countries where the electrical power is other than 110V/60Hz. Apple doesn't recommend using 50Hz power, however, because it adversely affects print registration and forces the printer's internal motors to run hotter, possibly wearing them out. Instead, you can have the printer's power supply replaced with a universal model (Apple



Service Part 915-0029 for ImageWriter II or 915-0031 for ImageWriter LQ). The universal power supply isn't sold in the U. S. You can ask a dealer in another country to install one, however. After the universal power supply has been installed, you can use the printer anywhere in the world without a transformer or any other addi-

tional equipment. Teodoro S. Kaufmann of the University of Mississippi unearthed these part numbers from information available to Apple service centers.

LUMPY TEXT

Q When my fellow teachers and I choose Monaco 10 in Chariot Software's MicroGrade, the screen display is all but illegible (see "Scaled Font"). Printed reports look fine, and other sizes of the same font display and print fine. What can we do to fix Monaco 10?

Sandra W. Foster

Douglas, Arizona

A Lumpy displayed text results when you choose an uninstalled font size. Monaco doesn't come in a 10-point size, so without a doubt it's not installed in your System file. What you see is not Monaco 10, but Monaco 12 scaled down to 10-point size. The other fonts that MicroGrade lets you choose (Monaco 9, Monaco 12, Geneva 9, Geneva 10, or Geneva 12) display fine because they are installed. You could fix Monaco 10, if it existed, by installing it in your System file using Apple's Font/DA Mover utility software. My advice: choose a different font.

Printed reports look OK because you're selecting the Draft quality option (or leaving it selected) in the Print dialog box. When an ImageWriter prints Draft quality, it uses its own built-in font, not the screen font. (An ImageWriter II has a Print Quality switch you can use to choose among its three built-in fonts.) If you select Faster or Best quality, the ImageWriter uses the screen font. Best quality deserves its name only when the font displayed is also installed at twice the size. For example, Geneva 10 calls for Geneva 20. The Mac reduces the double-size font to get the highest quality printing on an ImageWriter. Your System file probably has 18-, 20-, and 24-point Geneva, but not Monaco.

UNSIGHTLY TEMP FILE BUILDUP

Q Microsoft Word (presumably) adds to my System Folder from time to time files named Word Temp 1, Word Temp 2, and so on. Presently, 16 such files exist with sizes of 0K or 1K. Should I pe-

(continues)

riodically expunge these files or are they tied to saved documents produced in Word?

James P. Hartman
Wayne, Pennsylvania

A Many applications open temporary files in the System Folder and elsewhere. Word always opens a temporary file in the System Folder, and it uses the

file to hold your typing. Word may open a second temporary file in the System Folder if memory is running low when you save a document. Word saves the contents of the Clipboard in the second temporary file in an attempt to free some memory. In addition, Word may open temporary files in the folder that contains the Word application and any folder that contains an open Word document. Word

File Edit Windows Scores Reports			
Student Summary			
Henson, Scott			
I.D. 47955, Grade Average: 70.5%, C, Class rank: 5.			
Category	Assignment	Score	Grade
Tests (40%, 345) category average: 73.7%			
	Test 1 (60)	49	80.0% B
	Test 2 (75)	54	72.0% C
	Test 3 (50)	34	68.0% D
	Test 4 (100)	80	80.0% B
	Test 5 (60)	41	68.3% D
Midterm Exam (15%, 150)		110	73.3% C
Term Paper (20%, 100)		63	62.0% D
Name	I.D.	Final	Grade
Carten, Tom	48341	85.0%	B
Davis, Ann	24777	95.0%	A
Gates, Heather	58218	75.0%	C
Henson, Scott	47955	70.5%	C
Johnson, Sandra	95370	68.0%	D
Lu, Han	31080	83.0%	B

Scaled Font

When an application (in this case, MicroGrade) needs a font in an unavailable size, the Mac finds the font in an available size and scales it to the requested size.

is supposed to delete all its temporary files when you quit normally. If the power goes off, Word quits unexpectedly (it crashes), or the Mac suddenly quits working (it bombs), then Word doesn't get a chance to delete its temporary files. You may be able to reconstruct your work from the temporary files. To try, press Shift while choosing Open from Word's File menu.

Sometimes Word versions 3.02 and earlier don't remove temporary files from the System Folder, and the files accumulate over time. Word 4.0 seems free of this carelessness.

You can safely delete Word's temporary files by dragging them to the Trash. If you're using Word with MultiFinder, the Mac will not let you delete temporary files that are in use at the time. (It complains, "That item is locked or in use, and can't be removed." When you click OK, the Mac puts the busy file back in the folder from which the file came.)

MYSTERY FILE

Q While using PacerLink to transfer a document from my Mac II to our mainframe computer, I noticed a strange file named InvisiHDMaInBo3b on my Mac hard disk. This file does not appear anywhere on my Mac screen. I have no idea what this is or how it got there.

Jeff Wilson
Springboro, Ohio

A That file was created by Apple's backup utility, HDBackup. Some applications create invisible files, which don't appear in the Finder's disk and folder

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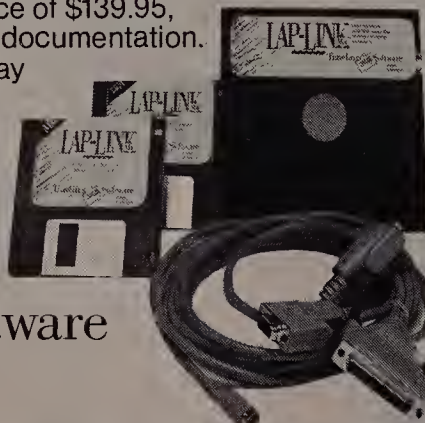
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Circle 304 on reader service card

windows or in the Open dialog boxes of most applications. File-transfer applications and a few others show all files, invisible or not. The file you found, and other similarly named files on your backup floppies, would be used during a restore operation.

COPY PREVENTION

Q Is there a simple way to prevent unauthorized users from pirating applications by copying them from a Macintosh hard disk to floppy disks?

Hilliard K. Macomber

Cedar Falls, Iowa

A You can't prevent everyone from copying an application and also allow anyone to open it, but there are a couple of ways to provide some security. Hard Disk DeadBolt from FWB (415/474-8055) can quickly lock most applications by encrypting them. No one can open or copy an encrypted application without supplying the correct password. You or a trusty who knows the password must unlock (decrypt) the application before your average user can open it and must relock (encrypt) the application when that user finishes. While the application is decrypted, anyone can copy it. This method of protecting applications against illicit copying is far from fail-safe.

Instead of temporarily encrypting an application, you can semipermanently make its icon invisible in the Finder. What can't be seen can't be copied. Invisible application icons can't be opened either, but you can always open the application by opening one of its documents. (Even though you can't see an application icon, the Finder knows where it is.) You can make any icon invisible using a utility such as DiskTop from CE Software (515/224-1995) or ResEdit from the Apple Programmer's and Developer's Association (800/282-2732).

Using DiskTop, first choose Preferences from the DiskTop menu and set the level to Technical. Click the Temporary button to get back to the file listing. Then locate the application you want to hide, select it, and choose Get Info from the DiskTop menu. You set the Invisible option in the dialog box that appears (see "The

Invisible Application"). Finally, click the Save button. That application's icon will not appear in the folder that contains it the next time you open the folder in the Finder. (If the folder is already open, close and reopen it.) The icon will still show up in DiskTop's file listing, and DiskTop can be used to copy applications, so you may want to remove DiskTop after hiding your application icons. To make an icon visible

again, reinstall DiskTop and use it to turn off the application's Invisible option.

CRICKET GRAPH CURVE FIT

TIP: I recently noticed that Cricket Graph 1.3 does not always correctly draw the line for the equation for a simple curve fit (see "Wrong Plot"). A line that should intercept the horizontal axis to the left of the axis's (continues)



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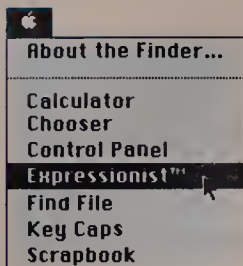
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Equations Made Easy

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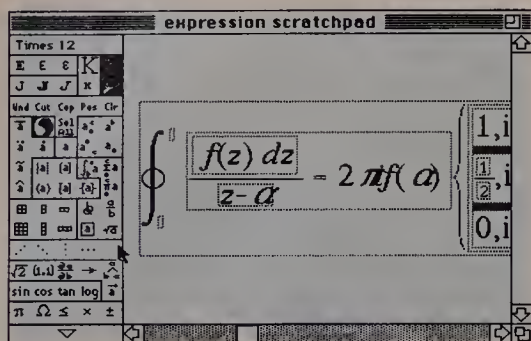
The Personal Mathematical Equation Editor



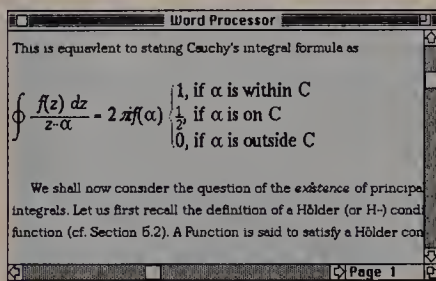
"The Expressionist upgrade has left the others in the dust"

- MacWorld magazine, February 1989

1.) Select the DA ...



2.) Create your equation ...



3.) Copy & paste into your word processor!

and get

Results like this:

$$\nabla^2 E - \frac{\mu \epsilon}{c^2} \frac{\partial^2 E}{\partial t^2} = 0$$

$$\nabla^2 B - \frac{\mu \epsilon}{c^2} \frac{\partial^2 B}{\partial t^2} = 0$$

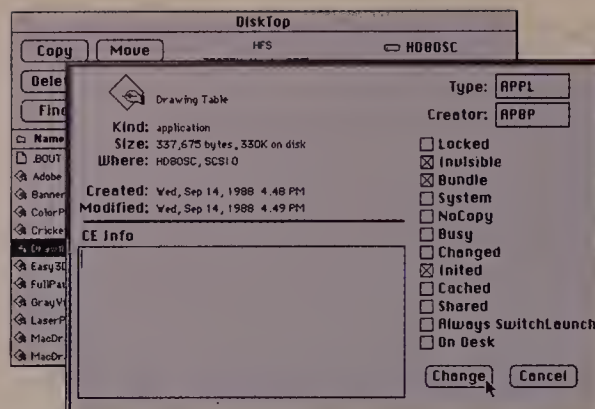
$$\operatorname{erfc} \left(\frac{|z_1 - z_2|}{\sqrt{2} \sqrt{\frac{1}{N_1 - 3} + \frac{1}{N_2 - 3}}} \right)$$

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QUICK TIPS

HOW TO



The Invisible Application

Setting an application's Invisible option (here using DiskTop from CE Software) makes the application's icon invisible in the Finder, which prevents anyone from copying the application. The application can still be accessed by opening any of its documents.

right end point tends to pass through that end point. To work around this problem, use a first-order polynomial curve fit, which is mathematically equivalent to a simple curve fit.

Jose Maria Delfino

New Haven, Connecticut

Curiously, this anomaly occurs in version 1.3 but not in version 1.1. Cricket Software plans to fix it in the next version.

FOUND IN TRASH

TIP: The Find File desk accessory thinks items in the Trash are still in their former locations. If you can't find a file or folder where Find File says it is, check the Trash.

Mike Peters

Stanford, California

FRACTIONAL INPUT AND OUTPUT

TIP: It's sometimes desirable to allow input of fractions, such as $1/2$ or $1\frac{1}{4}$, and to produce them as output. For instance, a cutting order for a carpenter who uses a tape measure would be most handy if the cutting sizes were expressed in fractions.

To accomplish this in FileMaker, you

need three fields: PP, RR, and SS. PP is a text field used for input of fractions and mixed numbers. RR is a calculation field that converts PP to a decimal value for use in any calculations involving other fields. SS is another calculation field that converts RR to a mixed fraction. Define field RR as follows.

```
if(position(PP,"/",1)=0,TextToNum(PP),
if(position(PP," ",1)=0,0,TextToNum
(left(PP,position(PP," ",1)-1))+TextToNum
(middle(PP,position(PP," ",1)+1,position
(PP,"/",1)-position(PP," ",1)-1))/
TextToNum(right(PP,length(PP)-position(PP,"/",1))))
```

The following definition of SS converts the decimal value in field RR to the nearest $1/16$.

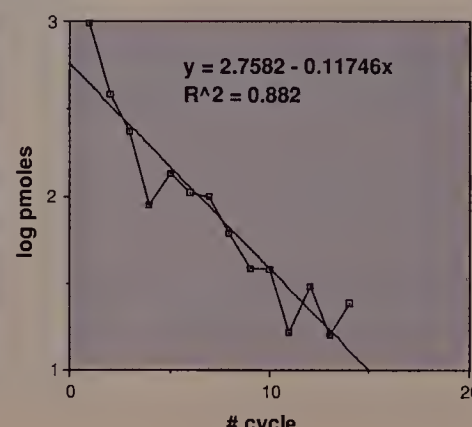
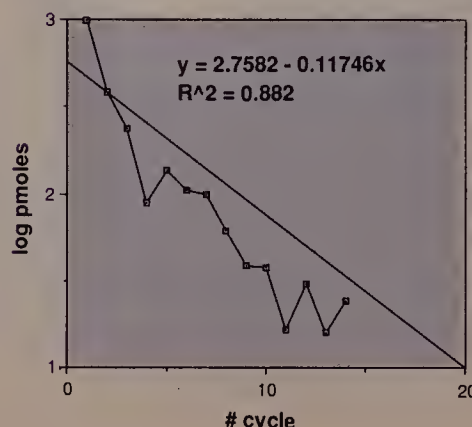
```
if(RR=int(RR),RR,if(int(RR)=0,"",
NumToText(int(RR))&" ")&if(2*RR=int(2*RR),
NumToText(2*(RR-int(RR)))&"/2",if(4*RR=int(4*RR),
NumToText(4*(RR-int(RR)))&"/4",if(8*RR=int
(8*RR),NumToText(8*(RR-int(RR)))&"/8",NumToText
(int(16*(RR-int(RR)))&"/16")))))
```

When entering the formula for field SS, select the Text option for the result of the calculation. Also, do not type any extra blank spaces in these long formulas. FileMaker allows only 256 characters per formula, and spaces count.

You could make the formulas simpler by breaking them up into subcalculations. For instance, you could define a field AA = position(PP,"/",1) and use AA in the RR formula. However, keeping track of intermediate calculations is more confusing than dealing with the two messy calculations defined here. By the way, you can reduce the character count in these formulas by using single-letter field names instead of PP, RR, and SS.

Dennis Talley

Cardiff by the Sea, California



Wrong Plot
If Cricket Graph 1.3 draws the wrong line when you choose Simple from its Curve Fit menu (left), choose Polynomial and specify 1 as the degree of the polynomial (right).

Similar formulas work in other applications, such as Excel and HyperCard.

CROOKED SCANS


TIP: With most optical character recognition (OCR) software (other than OmniPage), crooked scans cause a multitude of errors. Crooked scans usually result from crooked source material, be it a book, photocopy, laser printer output, or typewritten page. If you are using a flat-bed scanner, you can straighten a crooked source with tape. It is best to use removable tape or even Post-it notes to avoid damaging the source material. Align strips of tape parallel to one or two edges of the text, leaving the tape protruding past the edge of the page. Use the protruding tape to line up the page on the scanner.

Kim Baker
Mesa, Arizona

THUMBSCREW WRENCH

TIP: The overhang of the Jasmine BackPac hard disk at the back of my Mac Plus makes it nearly impossible to tighten the thumbscrews of the mouse plug. I nipped the pocket clip off the cap of a ballpoint pen to make the cap into a wrench that extends my reach 1½ inches beneath the BackPac. You may have to experiment to find a pen cap small enough to grip tightly, yet large enough to break loose when the thumbscrew is tight.

Brad Reed
Botkins, Ohio

.....
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Lon Poole answers readers' questions and offers advice in his monthly Macworld column. Many of the tips he's compiled can be found in his book Mac Insights (Microsoft Press, 1986). More recently he has written the quick reference, HyperTalk (Microsoft Press, 1988).

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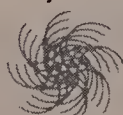
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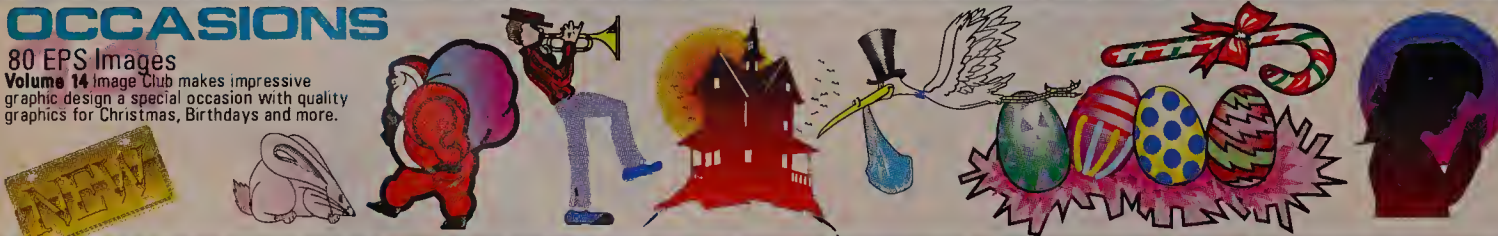
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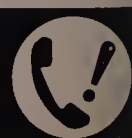
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Getting Started with Troubleshooting

Diagnose and fix common ailments with this introduction to Mac troubleshooting

by Jim Heid

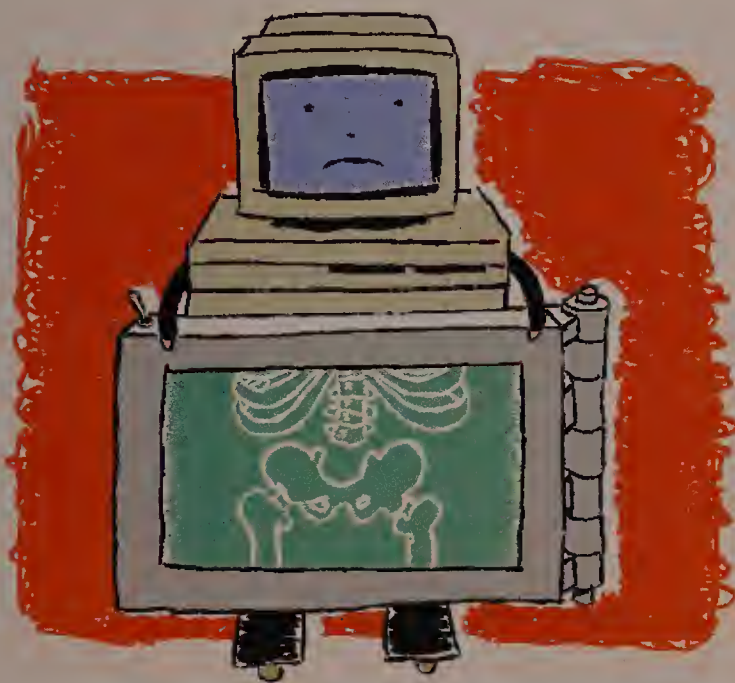
The Mac is reliable, but not infallible. And when problems do occur, the Mac's friendly facade can even work against you by hiding technical difficulties behind error messages that provide few clues to the problem. At such times the Mac seems to say, "Sorry, something is wrong, but I won't bore you with the details."

This month's column is a guide to troubleshooting common hardware and software problems. I've organized symptoms into these three general categories: start-up and system problems, disk and Finder problems, and printing and network problems; and I've provided at least one suggestion for each. (The sections that involve Font/DA Mover and the Desktop file may not be relevant

with Apple's new system software, version 7.0, which is due for release sometime in 1990. For more information on System 7.0, see "Here Comes System 7.0" in this issue.)

START-UP PROBLEMS AND SYSTEM CRASHES

You connected a hard disk, scanner, or some other SCSI device, but the Mac doesn't recognize it.



metal cable snaps to lock them into place.

- Make sure each device has a unique SCSI ID number. If two or more SCSI devices have the same number, one or

more of them may not work.

The Mac won't start from a hard disk that was previously working.



- The disk's start-up information—its *boot blocks*—may be damaged. If the Mac crashes during start-up, bad boot blocks may be to blame. You can make repairs using a disk-repair utility such as 1st Aid Software's 1st Aid Kit or Symantec's Symantec Utilities for Macintosh (SUM). For details on disk problems and repair programs, see "Rescuing a Hard Disk," *Macworld*, January 1989.

- If a dialog box appears saying "Can't load the Finder!", a system crash may have damaged the Finder or the System file (or both). Start up with a floppy disk containing the latest System Folder, and copy its Finder or System file (or both) to the hard disk's System Folder.

- Note:* After replacing the System file, you must reinstall any fonts and desk accessories you added (unless you have a backup copy of your current System file).

- The hard disk's *driver software*, which allows the Mac to recognize and access the hard disk, may be damaged. If your hard disk came with a diagnostic program, run it. Many hard disks allow you to reinstall the driver software without reinitializing (which would erase the contents of the disk).

- The crash may have corrupted the contents of the Mac's *parameter RAM*, the battery-powered memory that holds Control Panel settings, such as the time, date, current start-up device. Try resetting the parameter RAM: Start the Mac with a different disk, then hold down the ⌘, Shift, and Option keys while opening the Control Panel. A dialog box asks if you want to "zap" the parameter RAM. Click Yes, then restart.

You added a new INIT, desk accessory (DA), or font, and now the Mac crashes during start-up, when you try to use the INIT or DA, or when you try to start a program that was previously working properly.
(continues)

A SCSI PRIMER

One of the most error-prone steps in setting up a Mac involves connecting peripherals such as hard disks, scanners, and other devices to the Mac's high-speed SCSI bus. (SCSI, pronounced *scuzzy*, stands for small computer systems interface; a *bus* is a set of wires that form a common pathway for data.) Every Mac from the Plus on has a SCSI connector, a 25-pin female receptacle called a DB-25. Every Mac from the SE on also has a 50-pin SCSI connector inside its case for use with an internal hard disk.

The SCSI bus lets you connect up to seven peripherals to one port through a technique called *daisy-chaining*. All external SCSI devices have two 50-pin connectors. You connect the first peripheral to the Mac's SCSI port; you then use Apple's *Peripheral Interface Cable* to attach a second peripheral to the first.

When setting up SCSI peripherals, follow these two rules:

- Give each device on the SCSI bus a unique ID number.
- Be sure to terminate the SCSI chain properly.

SCSI Addresses

SCSI ID numbers range from 0 to 6. A device's ID number acts as its address—when the Mac sends data to a device, it transmits the device's ID along with the data. All the devices on the SCSI bus constantly "listen" for data, but only the device to which the data is addressed responds.

Besides being an electronic house number, an ID number also specifies a SCSI device's *priority*. The higher the ID number, the higher the device's priority. When two devices vie for the Mac's attention at the same time—as might occur when a scanning program saves an incoming image on disk during a scan—the Mac

turns its attention to the device with the higher ID number. The Mac, which is the first device in the SCSI chain, has a priority of 7.

Use the highest number (6) for an external hard disk. Use lower numbers for lower-priority hardware such as a scanner or tape-backup drive. You don't have to number devices sequentially; for example, you can use 6 for a hard disk and 3 for another device, skipping over numbers 4 and 5.

Usually, you specify a device's ID number by setting a switch on the device, although with some devices you change the ID by running a program. (Some users recommend avoiding the latter type of device; if address conflicts prevent the Mac from starting up, you may not be able to run the program to change the address.)

Terminating the Chain

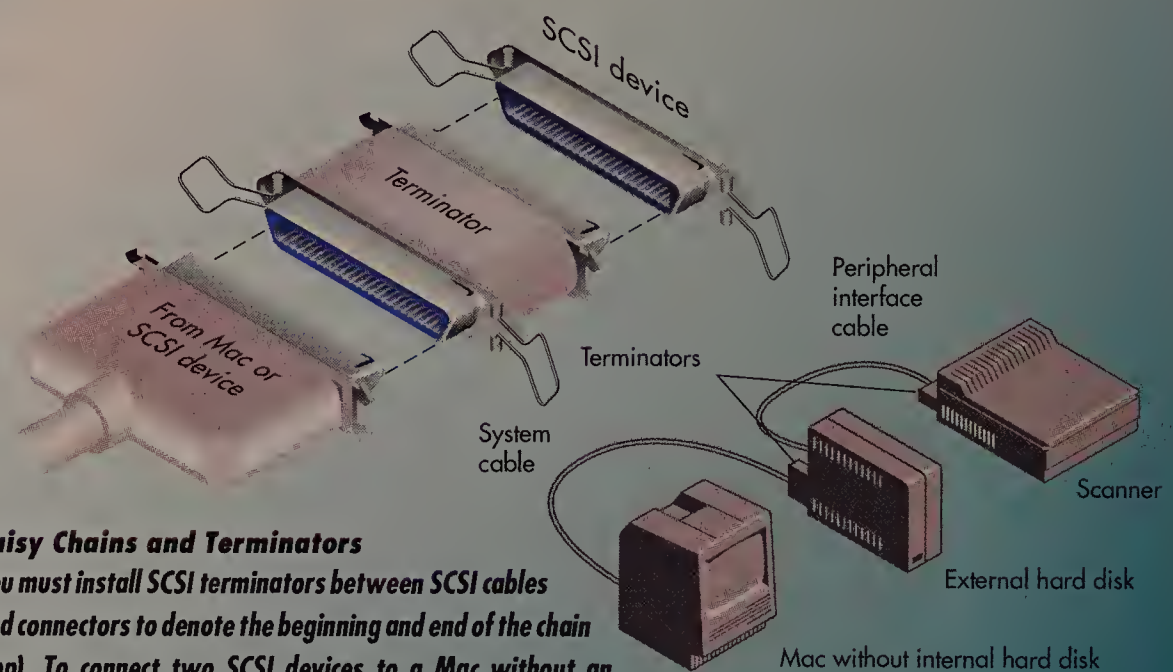
For the SCSI bus to work properly, the Mac must know where the SCSI chain begins and

ends. These vital boundaries are formed by *terminators*, special connectors that absorb the SCSI signals when they reach the end of the line.

The number of terminators you need in a SCSI chain depends on the number of devices you're using—one terminator for one device; two terminators for two or more devices. Some devices (such as internal hard disks) include built-in terminators; others don't.

The only specific termination guidelines I can offer are these: *never* use more than two terminators, whether internal or external; and *never* change a connection while any device (including the Mac) is on. Doing either may damage the Mac.

You can find numerous examples of how to use terminators in the Macintosh's manual. Check your peripherals' manuals to find out if they contain internal terminators so you'll know whether you need to add an external one.



Daisy Chains and Terminators

You must install SCSI terminators between SCSI cables and connectors to denote the beginning and end of the chain (top). To connect two SCSI devices to a Mac without an internal SCSI hard disk, attach the first peripheral to the Mac's SCSI port and then cable the second peripheral to the first (bottom).

▪ INITs—small, system-modifying programs that load during start-up—can conflict with each other or with applications. First, remove the suspect INIT from the System Folder (start the Mac with a different system disk if necessary), then restart. If the Mac doesn't crash, blame the

INIT. You can often cure INIT conflicts by renaming the offending INIT so that it loads in a different order (the Mac loads INITs in alphabetical order). If that fails, contact the INIT's developer.

▪ If the Mac acts up after you add a DA or a font, the System file (which holds both)

may be damaged. Restart using a different system disk, and copy its System file to the damaged disk. Make sure you're using the latest version of Font/DA Mover (at this writing, version 3.8). If the problem persists, the DA or font may be damaged. (continues)



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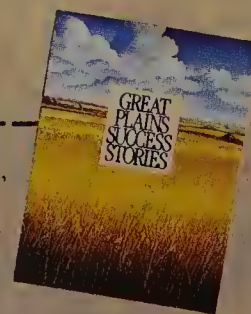
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GETTING STARTED

HOW TO

- When you run under MultiFinder, newly installed fonts and DAs don't always appear in the Font or the Apple menu (if this happens, try restarting the Mac). It's best to install Fonts and DAs from the Finder.
- If the Mac crashes only when you try to use the new DA, the DA itself may be damaged or improperly installed. Remove the DA, then reinstall it. If the problem persists, it may be that the DA's disk is defective, or the DA may not be compatible with your system configuration; contact the DA's developer.

You added a new INIT, but it isn't loading during start-up.

- Make sure that the new INIT is stored in the System Folder, then restart.
- Don't press any keys during start-up, and be sure the Caps Lock key isn't depressed; often you can bypass loading a particular INIT by pressing certain keys.

The Mac crashes when you start a program or open a DA, and the ID number in the bomb dialog box is 25 or 26.

- An ID=25 system crash indicates insufficient memory. Restart, then try one or more of the following: remove INITs; use the Control Panel to disable or reduce the size of the RAM cache; or use the Finder's Set Startup command to specify that the Mac not use MultiFinder. Restart again to allow the changes to take effect.
- An ID=26 crash indicates that the Mac's attempt to start the program was unsuccessful, perhaps due to corrupted data in memory or a damaged application file. Restart and try again. If the Mac still crashes, reinstall the application from its master disk.

DISK AND FINDER PROBLEMS

When you copy files using the Finder, an error message says that some files couldn't be written or read and were skipped.

- If the Mac couldn't write some files, the destination disk could be at fault. If you're copying multiple files, try copying one at a time. If that doesn't work, the destination disk may be magnetically or physically damaged. A temporary fix that usually

works for me is to use the Finder's Duplicate command to duplicate a small file on the destination disk. This will cause subsequently copied files to be stored on a different area of the disk. But make sure you back up the disk as soon as possible and then erase it. If problems surface after erasing, the disk may be physically damaged. Throw out a damaged floppy; a damaged hard disk can be repaired.

- If the Mac couldn't read some files, the source disk may be the culprit. If it's a floppy or removable hard disk, try ejecting and reinserting the disk; it may not have been seated properly. If you have two floppy drives, insert the source disk in the other drive. If these techniques fail, the source disk may be damaged. Use a disk-repair utility to scan the disk for errors, a process called *verifying*.

When you double-click on a document, the Finder says it can't be opened because "the application is busy or missing."

- If you don't have the application that created the document, you can't open the

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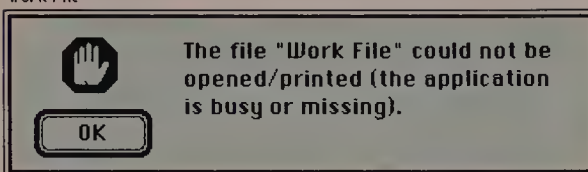
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file from the Finder, but you may be able to open it from within another application. For example, you can open MacWrite documents from within most word processors by using the word processor's Open command.

- The document may not be intended to be opened from the Finder (for example, a document that stores your working preferences or a spelling checker dictionary). If the document has a generic document icon, it probably can't be opened from the Finder (see "Generic Errors"). But again, you may be able to open it from within an application.
- The document, its application, or the disk's Desktop file, which contains information about the disk's contents, may be damaged (see "Desktop Details"). This is less likely than the previous situations, but it's possible. Every document file contains a 4-character *signature* that identifies the application that created it. If this signature is damaged, either in the document or in the Desktop file, the Finder won't know which application to open. Try rebuilding the Desktop file (as shown in "Desktop



Generic Errors

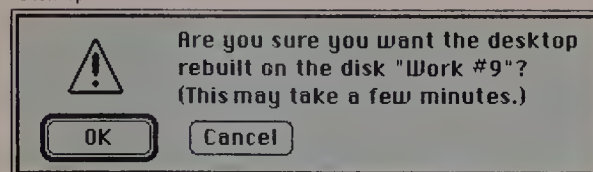
The Finder was unable to locate the application that created this document. This often occurs when you try to open or print a document that isn't intended to be opened from the Finder, such as an application's settings file, which stores your working preferences, or a temporary work file (whose generic icon is shown above).

Details") or using a disk utility to examine the document's file signature.

When you insert a disk, the Mac tells you that it needs minor repairs and asks if it should perform them.

- This usually indicates a damaged Desktop file. If you click OK, the Finder rebuilds the Desktop file.

When you insert a disk, the Mac tells you



Desktop Details

To rebuild the Desktop file (which stores important information about the disk's contents and the way you view them), press the ⌘ and Option keys while inserting the disk, and you'll see the message shown here. Note, however, that rebuilding the Desktop file causes the Finder to lose any Get Info comments you may have added to that disk.

that it's damaged or unreadable and asks if you want to initialize it.

- Just say no—unless you want to erase the disk. If the disk has important data on it, click Cancel to eject it. Then try inserting the disk again and/or restarting the Mac; if the same message appears, the disk is sick. Use a disk utility to diagnose its ailments and, if possible, recover its contents. (Use the utility to copy those con-

We'd better have them.

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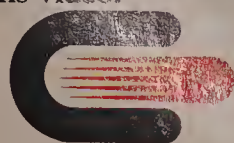
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GETTING STARTED

HOW TO

tents to another disk and then try making repairs on the copy, in case the recovery process backfires.)

- If you elect to initialize the disk and the Mac displays a message saying "Initialization Failed!" you'll know the disk is defective. Throw it out. Even if the initialization succeeds, think twice about using the disk for important work. It could be about to fail permanently.

When you choose Empty Trash, the Finder says that the Trash couldn't be emptied. Or, when you throw away a document or application, the Finder says that the item is in use and can't be removed.

- These problems occur when you throw away a file that the Mac is currently using—or thinks it is. When you open a file, the Mac makes notations in memory to indicate that the file is in use. These notations may remain unchanged until you quit the application—even if you use the application's Close command. Try quitting the application, then throwing the document away. If that fails, hold down the Option key while dragging the document into the Trash. Then hold down Option again while choosing Empty Trash. If this fails, restart and then throw the file away. The restarting process should close the file properly. If you frequently encounter this problem with a specific disk, try rebuilding the disk's Desktop file.

The Mac asks you to insert a disk that you ejected long ago.

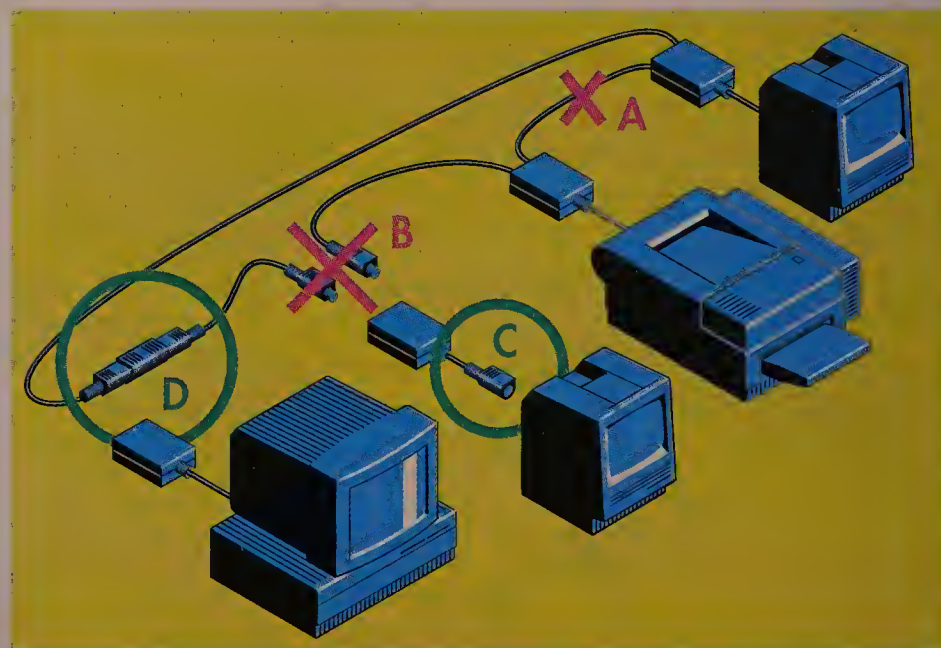
- When you use the Eject command, the Mac remembers that the disk still exists, and may ask to see it again. Dragging an icon to the Trash causes the Mac to forget the disk, thereby guaranteeing that you won't be asked for it again.

PRINTING AND NETWORK PROBLEMS

The Mac reports that it can't locate or access the printer.

- Verify that the start-up disk you're using is unlocked and that it contains at least 50K of free space. Many applications create temporary files during printing and can't print if the start-up disk is locked or nearly full.
- For ImageWriters: Check to make sure that the printer is connected and online (press the Select button), and that its paper supply hasn't run out. Use the Chooser to make sure that the ImageWriter driver and the proper connection port are selected. Then choose the Page Setup command, verify your print settings, click OK, and try again.
- For laser printers: Be sure the printer is on and that its paper tray contains paper and is properly seated. Use the Chooser to select the LaserWriter driver. If the printer's name doesn't appear in the Chooser window, the printer may not be warmed up, or you may have a LocalTalk wiring problem (see "Network Wiring"). Once the printer's name appears in the Chooser, select it, then use Page Setup to verify print settings, and try again.

Network Wiring
To avoid creating a circular network, never connect the last device in the network to the first (A). Other problems include loose connections and dangling unconnected cables (B). If you need to remove a device, either unplug its connector box (C) or insert a cable extender between the two dangling cables (D).



When you print to a laser printer, an error message appears saying that the printer was initialized with an earlier version and needs to be reinitialized.

▪ The Macs on your network have different versions of the LaserPrep and LaserWriter files. Each Mac on a network should have the same version (at this writing, version 5.2 is the latest).

You use TOPS, and some Macs occasionally lose contact with a server, causing TOPS to display the message, "Trying to connect to [server name]."

- Check your network wiring.
- Check to see if someone is using the server. Performing time-consuming tasks on a server—erasing a floppy, copying files, or installing a font or desk accessory—can cause time-outs. TOPS can usually reestablish the connection after the operation is completed. Avoid performing such tasks on a TOPS server that has published volumes (volumes that have been made available to other users on the network).

FOR MORE HELP

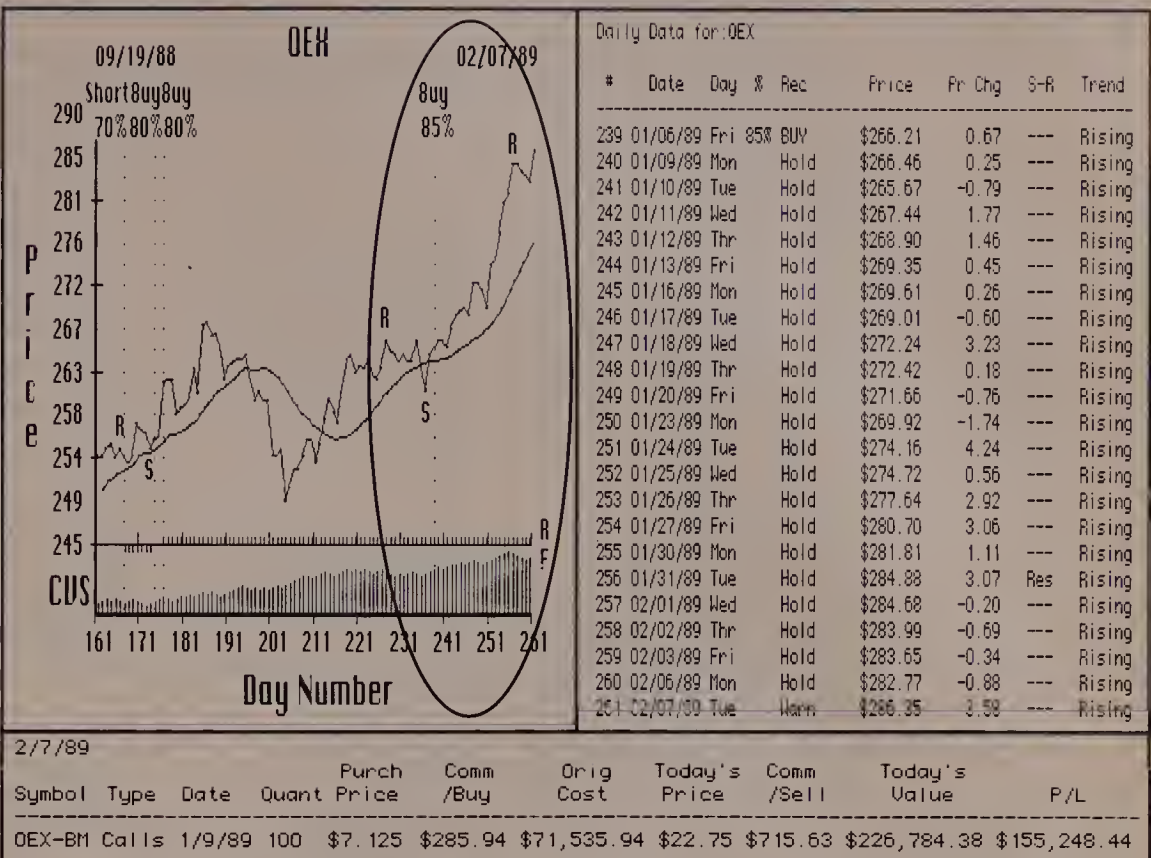
I've presented the most common Mac ailments here, but I haven't explored problems specific to a given product. Your best sources for that kind of help are manuals and firms' technical support hotlines.

But before you call the latter, be sure to compile the information the support technician will need to diagnose the problem. Take time before trouble strikes to write down your system configuration: the amount of memory, the System version (choose About the Finder), the names of any INITs and desk accessories you've installed, and a list of your peripherals. When a problem occurs, note the steps that caused it. And don't overlook local user groups, which can be superb sources of help. Chances are your problem isn't unique. **M**

Jim Heid is a Macworld contributing editor who focuses each month on a different aspect of Mac fundamentals.

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Image showing the Apple Macintosh user interface.

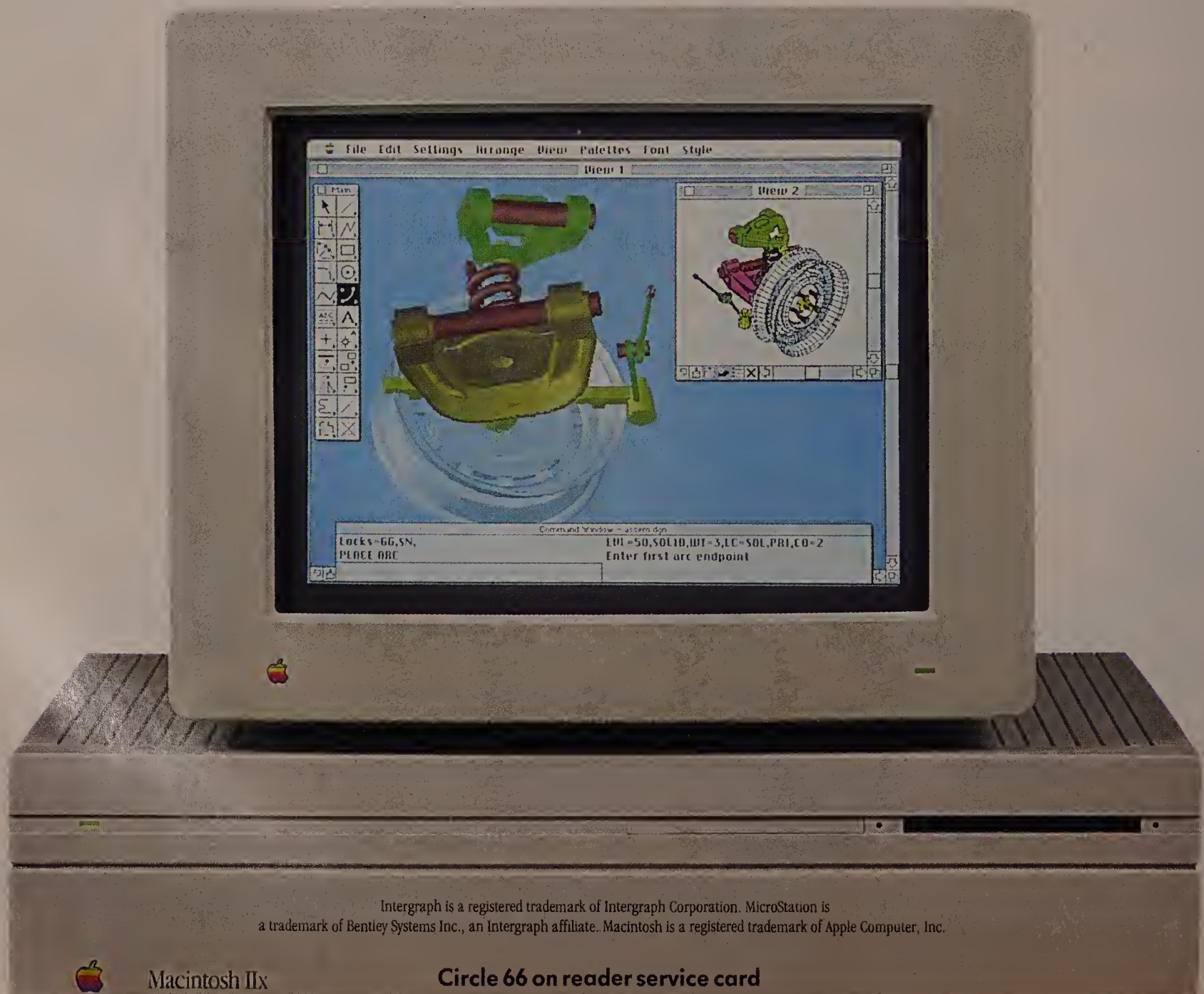
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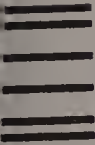
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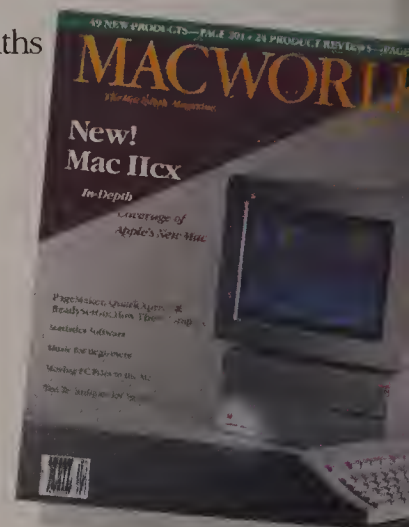


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MACWORLD

4AMD2

Insights on ReadySetGo 4.5

Techniques
for enhancing
your desktop
publishing prowess

by Robert C. Eckhardt

In the Macintosh page-layout arena, ReadySetGo, QuarkXPress, and PageMaker continue to be the three major players. ReadySetGo is favored by many desktop publishers because of its ease of use and its many popular features, including grid-based layout; pinpoint positioning of objects; style sheets; glossaries; and a built-in spelling checker.

With version 4.5, you'll find color text and objects, a wide array of gray-scale-image adjustments, alignment guide lines, precise typographic control, and both on-screen and printed thumbnails.

This collection of tips, shortcuts, and tricks should help increase your proficiency and productivity with ReadySetGo 4.5, whether you're new to the program or an old hand. Special thanks to Laura Lamar of MAX, Mark Astman and Peter Plitteris of Letraset USA, David Kater, author of *Mastering ReadySetGo* (Sybex, 1988), and George Mattingly, coauthor of the forthcoming *Guide to ReadySetGo* (Scott, Foresman), for their contributions.

COLOR AND TINT

To apply a color to text or an object, select the text with the insertion pointer or one or more objects with the object pointer (if an object is selected, be sure that it is filled with black). Then open the Color Selector dialog box by selecting the Color command from the Text, Fill, or Pen menu, as appropriate.

If the color you want to apply is a Pantone color, you can select it quickly in the Color Selector dialog box by typing the Pantone number and then a period. If it has a standard Pantone name, you can type the first few letters of the name instead. Or you can scroll the color list to view and click on a shade from a range of Pantone colors (see "A Pantone Scroll Bar").

You can also tint an object by filling it first with a shade of gray instead of black: select the object; choose the desired tint (from 10 percent to 90 percent) from the Fill menu; then, with the item still selected, pick the desired color as usual.

CUSTOM COLORS

After the first 2 colors in the Color Selector's list, the next 18 are user-defined, and they behave like a color style sheet. You can use the Custom Color and Custom Name buttons in the Color Selector dialog box to customize a selected color chip. All subsequent items as well as all previous ones colored with this chip will then display the new color.

DUPLICATING RULES

The Duplicate command is a convenient way to create regularly repeating elements, such as rules. For example, to create striped display text (as in the IBM logo), first draw a rule just below the top of the display text and select white as its pen color. With the new rule still selected, choose the Duplicate command.

In the Duplicate dialog box, set the horizontal offset to zero and the vertical offset to the desired distance between stripes, and specify a sufficient number of copies to span the height of the type. Click on OK and ReadySetGo does the rest. This technique can be used to add rules between lines of text in ornamental designs, business forms, and tables containing many columns of data (see "Repeating Rules").

SMART COPY

Objects copied from one page to another always paste into precisely the same position as on the source page. Unless the design of the two pages differs, the contents of entire pages can thus be cut (using the Select All command) and pasted without further adjustment.

This "smart copy" feature makes it easy to get around the Insert Page(s) command's inability to duplicate text (it only duplicates text blocks), and to copy the contents of one master page onto another. It's also useful for chapter openers that use only some elements of the





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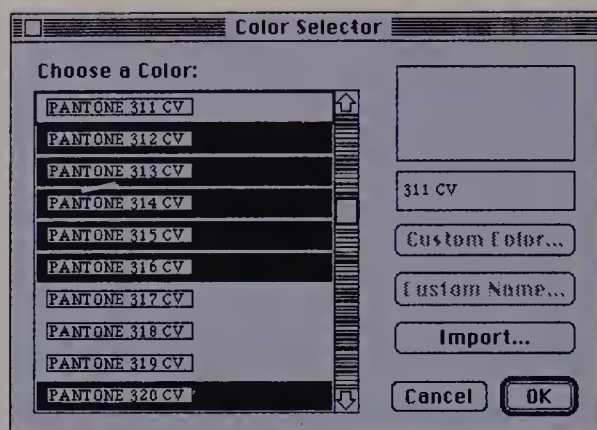
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A Pantone Scroll Bar

When you use the scroll bar in the Color Selector dialog box, the scroll box becomes transparent. Place the tip of the pointer over the color stripe that most closely matches the color you're looking for, and the scrolling list will jump to the appropriate section of the Pantone color catalog.

master page. In the master page, select the elements you want to use and copy them. Move to the first page of the chapter and turn off the Use Master command. Then paste the copied master-page elements; they will appear in the correct position automatically.

FONT INFORMATION

One of ReadySetGo 4.5's new features is that it stores font information by font name, not font ID number. This should eliminate the occurrence of mysteriously switched typefaces, something that often happens when a document created on one Mac is printed on another. If you have changed font names in order to group font families together on the Font menu, however, and you print using a Mac other than your own, you must restore the original names so that the correct fonts can be located on the other computer.

CONDENSED TEXT

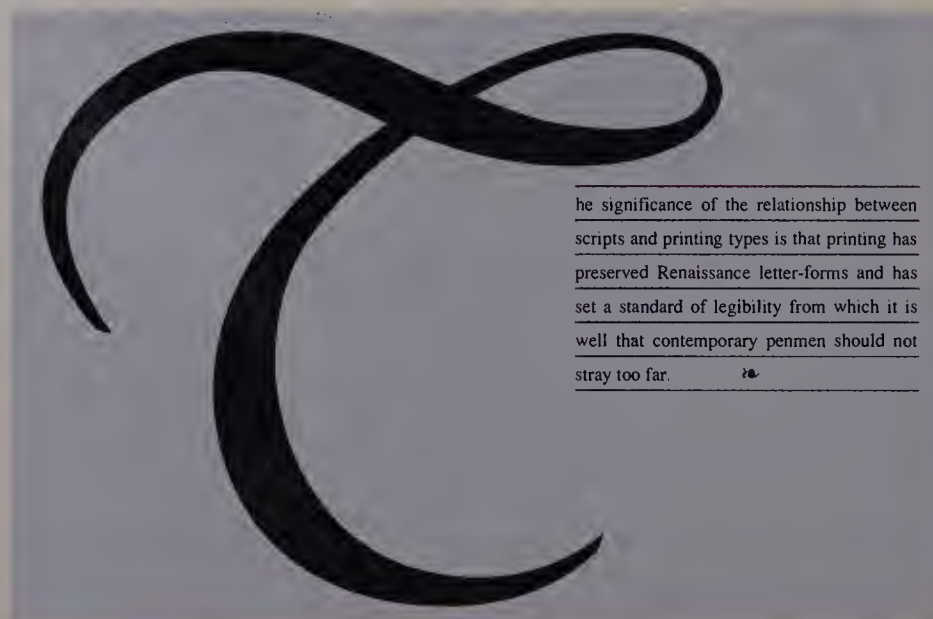
If you use the Condense text style, you'll notice that the resulting word spacing is too loose. To tighten it up, select the condensed text and set the word spacing in the Type Specs dialog box (under the Text menu) at about 80 percent. Another alternative is to select the text, remove the Condense style, and choose either the Track or the Auto Kern command from the Format menu. Track removes an equal amount of user-defined space between every letter pair in the selected text. Auto Kern (which appears when you press the Option key) removes varying amounts of space between each letter pair in the selected text according to the font's built-in kerning table.

TYPE EFFECTS

If you want to stretch or shrink text disproportionately, or create a point size larger than ReadySetGo allows, convert the text to a graphic image. To do so, select the text block with the object pointer (not the insertion pointer) and copy it. Then create a picture block, activate it with the cropping tool, and select Paste. Finally, press ⌘-M to open the picture block's Specifications dialog box and enter the desired scaling factors. This sort of text manipulation looks best, by the way, when used on serif typefaces with contrasting thick and thin strokes.

TURNING OFF HYPHENATION

The Hyphenation Specs dialog box can be used to turn off hyphenation for particular (continues)



Repeating Rules
To create repeating rules such as these, draw a rule above the first line of text and select the Duplicate command. In the Duplicate dialog box, specify a vertical offset equal to the leading and a number of copies equal to the number of lines in the text, then press Return.

he significance of the relationship between scripts and printing types is that printing has preserved Renaissance letter-forms and has set a standard of legibility from which it is well that contemporary penmen should not stray too far.

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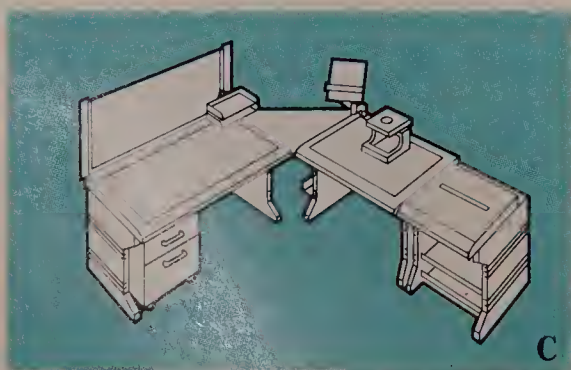
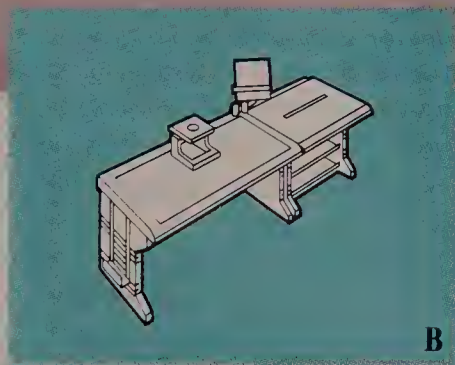
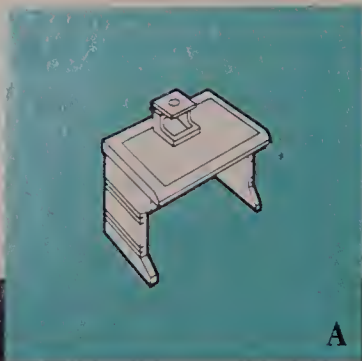
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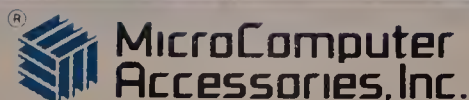
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words, such as personal names or your company name. To do so, simply enter the word, devoid of hyphens, in the exception list.

Also, don't forget that hyphenation can be turned on or off in a style sheet. For example, you can activate hyphenation for body copy and eliminate it for headings, subheads, and captions.

WORKING WITH TABS

Normally, the zero points of window rulers correspond to the upper-left corner of the page, whereas the zero point of a tab ruler corresponds to the upper-left corner of its text block. As a result, tab and window ruler markings usually don't match. You can put them in sync and thus make it easier to estimate tab positions with the window ruler. Just drag the object pointer from the empty square where the two window rulers meet to the upper-left corner of the text block.

POWER SEARCH (AND REPLACE)

If you press the Option key when you select either the Find or Replace command, you get more powerful find and replace options. You can search for or replace styles, fonts, and font sizes in the current block, the current chain, or the entire document (see "Replacing a Style").

Replacing a Style

In the power Replace dialog box, if you leave both Find and Change To text fields blank and turn on the All radio button, you can change all italic text, for example, to boldface text.

Whether you use basic or power techniques, you can find and replace normally invisible characters. To search for or replace a tab character, type %t (Option-D followed by t) in either the Find or Replace text fields. To search for or replace

a return character, type %r or %n (Option-D followed by r or n).

THE END IS NEAR

To find the end of a text chain, place the insertion point anywhere in the chain, press ⌘-A to select all its text, then press Option-Right Arrow. ReadySetGo will scroll to the last text block and place the insertion point after the last character.

GUIDE LINES AND GRIDS

ReadySetGo now offers both grids, which are useful for overall page design, and guide lines, which are especially helpful in aligning individual objects. You can use both in the same document, but not at the same time. Switch from one to the other by pressing ⌘-Shift-G to turn on the grid and ⌘-Shift-Y to turn on the (continues)

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guide lines. Guide lines can be made to run either over or under objects by selecting Top or Bottom from the Guides Draw pop-up menu in the Preferences dialog box. For most purposes, Top is the better choice.

SETTING UP A GRID

When creating a grid for a publication, it's usually a good idea to specify twice as many grid columns as there are text columns, to facilitate the creation of picture blocks that extend halfway across a column. The appropriate number of grid rows depends primarily on the design of the publication, and can range anywhere from one to a dozen or more.

Once the grid is in place, you can quickly confirm that the grid columns are the desired width by turning on the Snap To command and creating a full-column-width object with either the text, picture, or rectangle tool. Switch to the object pointer and double-click on the new object; the Specifications dialog box displays the width of the object to three decimal points.

PRESERVING DEFAULTS

If you commonly use the same grid structure or guide lines, don't overlook the new Save Defaults command in the File menu. You can preserve a wide variety of settings for use in any document, including grid structure, guide lines on the master pages, grid or guides on, view, settings in the Preferences and Page Setup dialog boxes, and so on.

STYLE SHEET SHORTCUTS

Using keyboard shortcuts to apply style sheets can save you a lot of time. To create the shortcut, simply add a slash and whichever single character you prefer after the name of the style in the Style Specifications dialog box. To apply the style using the shortcut, select the text to be styled, press ⌘-H, and then, before the dialog box opens, type the one-character shortcut. (This technique works with glossary entries as well.)

CREATING A NEW STYLE SHEET

When you're creating a new style sheet, it's often convenient to base it on an

existing style sheet or on already-formatted text. To do so, first place the insertion point within some model text formatted with either a style sheet or with individual format commands. (Do not select the text.) Then choose the Styles command. Click on the New button, and the attributes of the text surrounding the insertion point are entered automatically in the Style Specifications dialog box.

USING THUMBNAILED

You can print Thumbnails to get an overview of your document or use them on screen to edit page order. To rearrange pages, choose the Thumbnails command, select and drag the thumbnail page (or pages) until the pointer points to the new location between two other pages, and release the mouse button.

HOMEMADE THUMBNAILED

The contents of thumbnail pages are fixed, but you can easily create a "homemade" thumbnail page, or a pair of editable facing pages. To do so, open a new document, add text blocks, fill them with the

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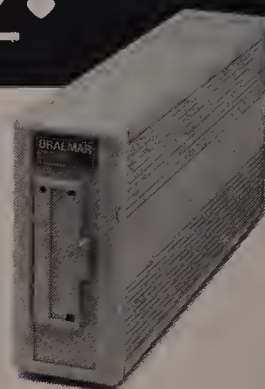
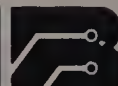
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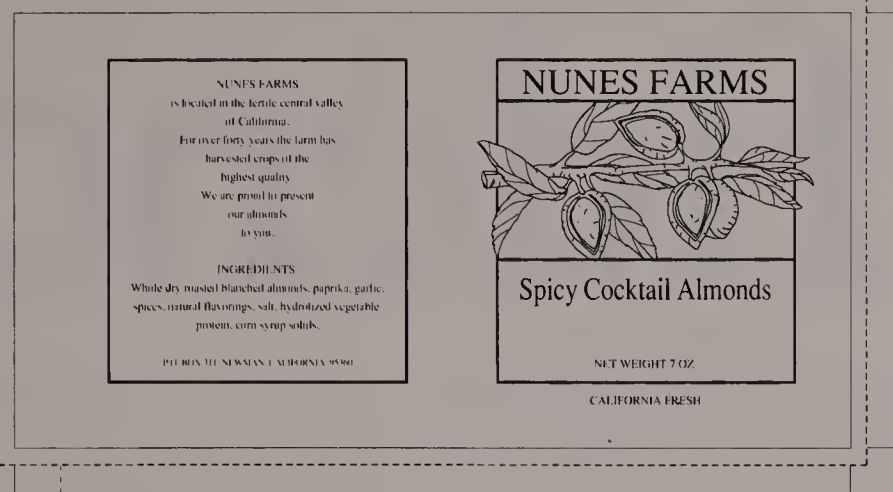
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*Suggested retail price, Spring 1989 The SX40 uses the Micro Tape DC2000 Cartridge.

Special Instructions
The outer trim (solid) and bleed (dashed) lines for this can label are simply large rectangular objects. The bleed line rectangle is filled to hide all but the ends of the crop-mark lines. During the final print run, the Don't Print option is turned on for the trim-line rectangle.



horizontal stripe pattern opposite the 20 percent tint in the Fill menu (to simulate text), and choose the Half Size page view. Add picture blocks, change column width, and so on, and the striped fill rewraps accordingly. When the design is complete, delete the fill pattern and fill the text blocks with text.

REDUCING YOUR OVERHEAD

Too many large illustrations can slow down ReadySetGo. To minimize performance degradation, crop illustrations whenever possible before importing them (using a desk accessory such as SmartScrap or The Curator DA), rather than after.

PICTURE THIS

If you've misplaced a graphics file and can't remember its name, select the picture block in which it appears and press ⌘-M. You'll see a Specifications dialog box that lists the name of the corresponding graphics file and its format.

DON'T PRINT

The Don't Print option is useful in a number of ways. It can speed up printing a test copy by suppressing text and graphics that don't currently interest you. It can also prevent the printing of fold guides in a brochure, notes to your printer or editor, or trim marks for nonstandard page margins (see "Special Instructions"). To suppress printing, select the object that shouldn't print, press ⌘-M, turn on the Don't Print option in the Specifications dialog box, and press Return.

By turning on the Runaround option in the Specifications dialog box as well, you can use nonprinting rules to push text

into odd shapes or create angled margins. Or you can use nonprinting, runaround rules to create a custom text-wrap around an illustration, such as one that allows text to extend a short distance inside the boundaries of the image.


QUESTIONS? ANSWERS?

If you have a late-night or weekend question that just can't wait, don't forget that Letraset provides online technical support on GENie at any hour, as well as toll-free telephone support during business hours. Just log on to GENie, type **LETRASET** at the system prompt, and press Return to enter the Letraset Roundtable.

IMPORTING WORD FILES

Microsoft Word files will pour into text blocks much more quickly if you save the files with Word's Fast Save option turned off. If you don't lose important formatting in the process, a time-saving alternative is to save the Word file in MacWrite format.

SHARE THE WEALTH

If you know of a shortcut or an undocumented technique that is not mentioned here, share it with other *Macworld* readers by sending it to *QuickTips*, *Macworld*, 501 Second Street, San Francisco, CA 94107. 

See *Where to Buy* for contact information.

Robert C. Eckhardt is a Macworld contributing editor and author of The Fully Powered Mac (1988) and The FullWrite Professional Handbook (1989), both published by Brady Books.

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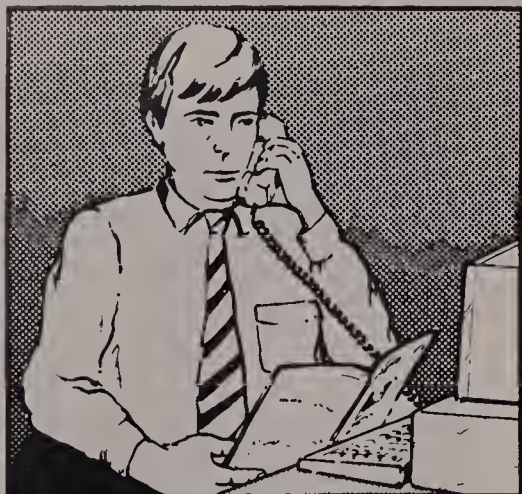
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Ask These Important Questions

- How long has the company been in business?
- Does the company offer technical assistance?
- Is there a service facility?
- Are manufacturer's warranties handled through the company?
- Does the seller have formal return and refund policies?
- Is there an additional charge for use of credit cards?
- Are credit card charges held until time of shipment?
- What are shipping costs for items ordered?

Reputable computer dealers will answer all these questions to your satisfaction. Don't settle for less when buying your computer hardware, software, peripherals and supplies.

Purchasing Guidelines

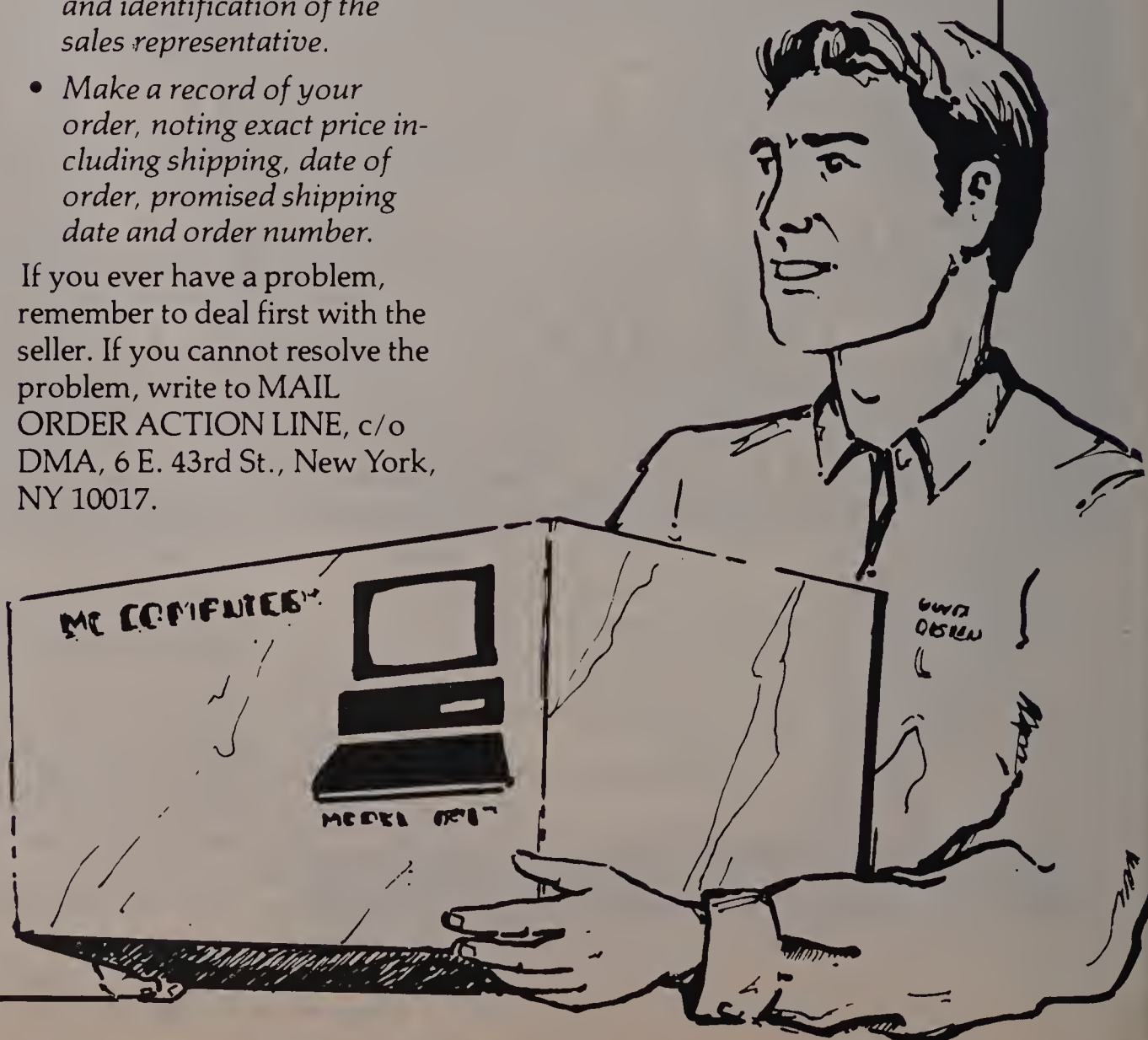
- State as completely and accurately as you can what merchandise you want including brand name, model number, catalog number.
- Establish that the item is in stock and confirm shipping date.
- Confirm that the price is as advertised.
- Obtain an order number and identification of the sales representative.
- Make a record of your order, noting exact price including shipping, date of order, promised shipping date and order number.

If you ever have a problem, remember to deal first with the seller. If you cannot resolve the problem, write to MAIL ORDER ACTION LINE, c/o DMA, 6 E. 43rd St., New York, NY 10017.

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UPDATES

This list brings you the highlights of software updates recently received but not yet tested. The first price is the upgrade cost for registered owners; the second is the current list price.

AdWriter version 2.1 imports, and interactively rotates, graphics and can apply dashed lines to any polygonal image. Includes improved zoom features and supports em space, en space, and thin space units of measure. MycroTek, 9229 E. 37th St. N, Wichita, KS 67226; 316/681-0550, 800/835-2055. Free; \$1995 new.

AntiToxin version 1.1 includes protection against ANTI virus, detects viruses on CD ROM disks, and has an option to check a disk or file without automatically re-pairing it. Lets users save as a text file reports of viruses found and files repaired. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301; 818/991-6540. Free; \$99.95 new.

Business Filevision version 1.5 has increased compatibility with Multi-Finder and the Mac II, new file-handling routines, larger record and field size, and additional text-handling attributes. Marvelin Corp., 3420 Ocean Park Blvd., #3020, Santa Monica, CA 90405; 213/450-6813. Contact Marvelin for upgrade policy; \$395 new.

Empower version 2.05 gives users with security administrator status the option to prevent start-up of the Mac from internal or external floppy disk drives. Magna, 2540 N. First St., #302, San Jose, CA 95131; 408/433-5467. Free; \$395 new.

Extend version 1.1 has a File I/O function to read, write, and format ASCII files to and from other applications or computers. Has serial port I/O functions to interact with Mac serial ports. Also includes rectangular and dot plots. Imagine That, 7109 Via Carmela, San Jose, CA 95139; 408/365-0305, 800/535-0900. \$20 if originally purchased before September 1, 1988; free if originally purchased after that date; \$495 new.

Ferrari Grand Prix version 1.6 is an updated version of the Formula 1 racing program. Runs on the Mac II, IIx, and SE/30. Bullseye Software, P.O. Drawer 7900, Incline Village, NV 89450; 702/265-2298. \$10 with original disk; \$59.95 new.

Full Impact version 1.1 has an X-Macro feature with sample files, source code in several development environments, and languages with header and linking commands to create XMacros. Ability to access foreign language dictionaries in French, Italian, German, Swedish, Dutch, and Spanish. Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1319; 213/329-8000. Free; \$395 new.

FullWrite Professional version 1.1 lets users access foreign language dictionaries from within a document. Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1319; 213/329-8000. Free; \$395 new.

MacClint version 1.1 supports Multi-Finder so that program continues to run in the background while
(continues)

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4th Dimension...1.0.6...NCP	388
ImageStudio...1.5...NCP	269
Jam Factory...1.32...CP	162
KidTalk...1.0...NCP	29
MacGolf Classic (Color)...3.0...CP	54
MacMoney...3.02...NCP	61
MacProof...3.2...NCP	114
MacVegas...1.3...CP	45
MicroPhone II...3.0...NCP	219
MiniCad+...2.0...NCP	515
More II...2.01...NCP	224
Panorama...1.1.1...NCP	203
☆ PowerMath II...2.5...NCP	108
Quicken...1.01...NCP	32
☆ Read-It! Personal...2.0...NCP	98
☆ SAM (Symantec AntiVirus)...1.0...NCP	64
Speller Bee...1.0...NCP	25
Spelling Coach Prof...3.1...NCP	104
☆ Strictly Business GL...1.98...NCP (60% off)	158
Suitcase II...1.2.3...NCP	44
SuperCard...1.0...NCP	134
SuperLaserSpool...2.0...NCP	78
Super 3D (Color)...2.0...NCP	325
Symantec Utilities...1.11...NCP	64
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another program runs in the foreground. Includes function prototype definitions for *Inside Macintosh Volume 5* and has nominal support for Aztec C Compiler. Includes bug fixes. MMC AD Systems, Box 360845, Milpitas, CA 95035; 408/263-0781. Free; \$99.95 new.

MacEnvelope version 4.1 now prints bar-coded envelopes and labels. Preview screen lets you see the envelope before printing and offers predefined layouts for laser labels and continuous labels. Synex, 692 Tenth St., Brooklyn, NY 11215-4502; 718/499-6293. \$5 with disk for registered owners of version 4.0; \$25 for registered owners of earlier versions; \$89.95 new.

MacHerbal version 2.0 adds a Prescription Writer template, revised Chinese herbal database, auto-entry for patient data, and diagnostic and procedure codes and fees. Also has an enlarged diagnostic and procedural code file listing and new user guide. Summerland Press, P.O. Box 2001, Vineyard Haven, MA 02568; 508/693-5202. \$49; \$295 new.

MacMainFrame 3270/CUT version 2.1 supports MacMainFrame DX, external box-level system that allows remote and local IBM 3270 main-frame communications from any Mac. Supports IBM 3278 Model 2 emulation and Avatar's proprietary file-transfer capabilities, IBM 3278/79 terminal emulation, and color. Avatar, 65 South St., Hopkinton, MA 01748; 508/435-3000. \$100 for upgrade kit; \$200 per copy for software-only package new; \$1195 bundled with hardware.

MacProof version 3.2 is now format-compatible with PageMaker 3.0 and Microsoft Word 4.0. Revisions have been made in coverage of proper nouns, geographical and

technical terms, and algorithms; change options; and documentation. Lexpertise Linguistic Software, Chateau De Vaumarcus, 2028 Vaumarcus, Switzerland; 800/354-5656 in the U.S. or 41 38 55 31 31 in Europe. \$30; \$195 new.

MathType version 2.0 automatically formats documents using rules of mathematical typesetting. Uses tab system for multiple-column alignment and contains a ruler with graduations in points, picas, inches, centimeters, and millimeters. Supports fractional point sizes and produces tables and matrices with solid, dashed, and dotted lines. Customizable user interface. Design Science, 6475-B E. Pacific Coast Hwy., #392, Long Beach, CA 90803; 213/433-0685; \$35 if originally purchased before November 1, 1988; free if originally purchased after that date; \$149 new.

Microsoft Word version 4.0 has increased layout capability, special table formatting to make it easier to do side-by-side paragraphs, lists, and forms. Absolute positioning for sidebars and graphics lets you lock selected material onto a specific page location and wrap text around it. QuickSwitch feature establishes a link between Word and graphics or charts created with other applications and dynamically updates changes. Microsoft, 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 800/426-9400. Free if earlier version originally purchased on or after May 1, 1988, \$75 plus s/h if purchased before that date; \$395 new.

P51 Mustang Flight Simulator version 2.0.4 runs on the Macintosh II, IIfx, and SE/30. Bullseye Software, P.O. Drawer 7900, Incline Village, NV 89450; 702/265-2298. \$10 with original disk; \$59.95 new.

Plains & Simple version 1.06 is compatible with Apple's ImageWriter LQ, Apple LaserWriters, and with System 6.0.2 and Finder 6.1 or earlier versions. Offers keyboard shortcuts for host commands listed in the File and Special menus. Great Plains Software, 1701 S.W. 38th St., Fargo, ND 58103; 701/281-0550. Free for users on technical support plan; \$50 if not on plan; \$395 new.

Prototyper version 2.01 has auto-centering for windows, an Undo command, and alignment tools; supports large monitors. Menu editor supports hierarchical menus and will open and close windows and enable or disable menus. SmethersBarnes, P.O. Box 639, Dept. 400, Portland, OR 97207; 503/274-2800. \$79; \$249 new.

Sniffer version 2.1 is a LAN-analysis tool for LANs that use ISO protocol software. Supports SNMP, CMOT, and ISODE high-level ISO protocols for use on top of TCP/IP networks. Network General, 1945A Charleston Rd., Mountain View, CA 94043; 415/965-1800. \$50 if under warranty or extended maintenance, \$350 if neither; \$12,500-\$24,000 bundled with analyzer base unit new.


Super 3D version 2.0 uses unique dithering technique for color support. Can import 2-D objects in PICT format and translate them into 3-D. Uses tweening, which automatically creates intermediate frames to simplify animation. Has math coprocessor support and lets you export animations from Super 3D in PICT format for playback in other programs. Silicon Beach Software, 9770 Carroll Center Rd., Ste. J, San Diego, CA 92126; 619/695-6956. \$200; \$495 new.

TextPert version 3.0 automatically recognizes fonts, includes Page

Analysis feature to differentiate between columns, titles, illustrations, and captions; maintains column order, tabs, and tables during scanning. Reads type-set, proportionally spaced, and kerned text. Program can read text that has been skewed up to a 25-degree angle, and can read at a speed of 30-60 characters per second. CTA, 747 Third Ave., Third Fl., New York, NY 10017; 800/252-1442. Free; \$995 new.

Thunder II checks for errors in spelling, capitalization, punctuation, and word doubles at a rate of 100 words per second. Corrects mistakes as you type. Appears automatically on the menu bar of the host application. Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404; 415/571-7171. \$30 with original disk; \$79.95.

Virex version 1.4 has been updated to combat the MEV# and AIDS viruses. HJC Software, P.O. Box 51816, Durham, NC 27717; 919/490-1277. \$15 if originally purchased before March 30, 1989; free if purchased after that date; \$75 per year for subscription; \$99.95 single copy new.

WordPerfect version 1.02 allows for absolute tab settings and lets you set tabs to within 1/72 inch. Also supports A/UX operating system and eliminates screen flicker that occurred when text was entered in original version. WordPerfect Corp., 1555 N. Technology Way, Orem, UT 84057; 801/222-5000. Free; \$395. 

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To have products listed in this section, send up-graded software, an outline of major changes since the previous release, upgrade price, suggested retail price, company name, mailing address, and phone number to Updates, Macworld, 501 Second St., San Francisco, CA 94107.

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WHERE TO BUY

This listing provides company addresses and phone numbers for products mentioned in this issue. Allow several weeks for responses to Reader Service Card inquiries. Asterisks indicate vendors who prefer to be contacted by phone.

Reader Service

- 751 Acta Advantage** Symmetry Corp., 761 E. University Dr., Ste. C, Mesa, AZ 85203; 602/844-2199, 800/624-2485.
- 752 Adobe Collector's Edition** Adobe Systems, Inc., P.O. Box 7900, Mountain View, CA 94039-7900; 415/961-4400, 800/833-6687.
- 753 Adobe Illustrator 88** Adobe Systems, Inc., P.O. Box 7900, Mountain View, CA 94039-7900; 415/961-4400, 800/833-6687.
- 754 Advanced NetWare** Novell, Inc., 890 Ross Dr., Sunnyvale, CA 94089; 408/747-4000.
- 755 Agfa Compugraphic P3400PS** Agfa Compugraphic Division, 80 Industrial Way, Mailstop 80-A-7C, Wilmington, MA 01887; 508/658-5600.
- 756 Aldus FreeHand** Aldus Corp., 411 First Ave. S, Seattle, WA 98104; 206/622-5500.
- 757 AppleColor High-Resolution RGB Monitor** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.
- 758 The Art Importer** Altsys Corp., 720 Avenue F, #109, Plano, TX 75074; 214/424-4888.
- 759 Canvas** Deneba Software, 3305 N.W. 74th Ave., Miami, FL 33122;

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- 305/594-6965, 800/622-6827.
- 760 Cricket Draw** Cricket Software, Inc., 40 Valley Stream Pkwy., Malvern, PA 19355; 215/251-9890.
- 761 DeskPaint 2.0 and DeskDraw** Zedcor, Inc., 4500 E. Speedway, #22, Tucson, AZ 85712-5305; 602/881-8101, 800/482-4567.
- 762 Digital Darkroom** Silicon Beach Software, Inc., P.O. Box 261430, San Diego, CA 92126; 619/695-6956.
- * Drawing Table** Brøderbund Software, Inc., 17 Paul Dr., San Rafael, CA 94903-2101; 415/492-3200, 800/527-6263.
- 763 E-Machines C20, E-Machines T16, E-Machines T19, E-Machines TX** E-Machines, Inc., 9305 S.W. Gemini Dr., Beaverton, OR 97005; 503/646-6699.

- 764 Fastat** Systat, Inc., 1800 Sherman, Evanston, IL 60201; 312/864-5670.
- 765 FileMaker II** Claris Corp., P.O. Box 58168, Santa Clara, CA 95052; 408/987-7000, 800/334-3535.
- 766 Fontographer** Altsys Corp., 720 Avenue F, #109, Plano, TX 75074; 214/424-4888.

- 767 HFS Backup** Personal Computer Peripherals Corp., 4710 Eisenhower Blvd., Bldg. A4, Tampa, FL 33634; 813/884-3092, 800/622-2888.

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- 768 HyperCard** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.
- 769 ImageStudio** Letraset USA, 40 Eisenhower Dr., Paramus, NJ 07653; 201/845-6100.
- 770 ImageWriter II Printer** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.
- 771 Intersect CDR-77** NEC Home Electronics (USA), Inc., 1255 Michael Dr., Wood Dale, IL 60191; 312/860-9500, 800/366-3632.

- 772 Kroy Kolor** Kroy, Inc., 14555 N. Hayden Rd., Scottsdale, AZ 85260-4300; 602/948-2222, 800/521-4997.

- 773 Liaison** Infosphere, Inc., 4730 S.W. Macadam Ave., Portland, OR 97201; 503/226-3620, 800/445-7085.

- 774 MacDraw** Claris Corp., P.O. Box 58168, Santa Clara, CA 95052; 408/987-7000, 800/334-3535.
- 775 MacDraw II** Claris Corp., P.O. Box 58168, Santa Clara, CA 95052; 408/987-7000, 800/334-3535.
- 776 MacPaint** Claris Corp., P.O. Box 58168, Santa Clara, CA 95052; 408/987-7000, 800/334-3535.
- 777 MacProject II** Claris Corp., P.O. Box 58168, Santa Clara, CA 95052; 408/987-7000, 800/334-3535.

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- 778 McMax** Nantucket Corp., 12555 W. Jefferson Blvd., Los Angeles, CA 90066; 213/390-7923.
- 779 Megascreeen 2008** MegaGraphics, Inc., 439 Calle San Pablo, Camarillo, CA 93010; 805/484-3799.
- * MFLauncher II** Impossible Dreams Software, Inc., 915 Oakcrest St., Iowa City, IA 52246; 319/351-5703.
- * Microsoft Excel, Microsoft Word** Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080, 800/426-9400.

- 780 NetWare for the Mac** Novell, Inc., 890 Ross Dr., Sunnyvale, CA 94089; 408/747-4000.

- 781 NumberMaze** Great Wave Software, Inc., 5353 Scotts Valley Dr., Scotts Valley, CA 95066; 408/438-1990.

- 782 Objectworks for Smalltalk-80** ParcPlace, Inc., 1550 Plymouth, Mountain View, CA 94030; 415/859-1000.

- 783 OvalTune** Intelligent Music, 116 N. Lake Ave., Albany, NY 12206; 518/434-4110.

- 784 PageMaker** Aldus Corp., 411 First Ave. S, Seattle, WA 98104; 206/622-5500.

- 785 PCPC II** Personal Computer Peripherals Corporation, 4710 Eisenhower Blvd., Bldg. A4, Tampa, FL 33634; 813/884-3092, 800/622-2888.

(continues)

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* **PixelPaint** SuperMac Technology, 295 N. Bernardo Ave., Mountain View, CA 94043; 415/964-8884.

786 **The Profit Center** Tronsoft, Inc., 133 W. de la Guerra, Santa Barbara, CA 93101-3289; 805/564-3386.

Q

787 **QuarkXPress** Quark, Inc., 300 S. Jackson, #100, Denver, CO 80209; 303/934-2211, 800/356-9363.

R

788 **Radius Color Display System** Radius, Inc., 404 E. Plumeria Dr., San Jose, CA 95134; 408/434-1010.

789 **RasterOps 1948H, RasterOps 1948S** RasterOps Corp., 10161 Bubb Rd., Cupertino, CA 95014; 408/446-4090.

790 **ReadySetGo** Letraset USA, 40

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Eisenhower Dr., Paramus, NJ 07653; 201/845-6100.

S

791 **SFT NetWare** Novell, Inc., 890 Ross Dr., Sunnyvale, CA 94089; 408/747-4000.

792 **Smalltalk/V Mac** Digitalk, Inc., 9841 Airport Blvd., Los Angeles, CA 90045; 213/645-1082, 800/922-8255.

793 **SmartScrap & The Clipper** Solutions International, 30 Commerce St., Williston, VT 05495; 802/865-9220.

794 **SoundWave** (formerly **SoundCap**, from Impulse Software) Authorware, Inc., 8500 Normandale Lake Blvd., 9th Fl., Minneapolis, MN 55437; 612/921-8555.

* **SuperMac 19 Color Monitor** SuperMac Technology, 295 N. Bernardo Ave., Mountain View, CA 94043; 415/964-8884.

795 **SuperPaint** Silicon Beach Soft-

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ware, Inc., PO Box 261430, San Diego, CA 92126; 619/695-6956.

T

796 **TableTools** Mansfield Systems, Inc., 550 Hamilton Ave., #150, Palo Alto, CA 94301; 415/326-0603.

797 **Tektronix Color Image Printer** Tektronix, Inc., P.O. Box 1000, Mailstop 63-447, Wilsonville, OR 97070; 800/835-6100.

798 **Two-Minute Nutrition Manager** DPEX, 3333 Bowers Ave., #190, Santa Clara, CA 95054; 408/727-7121.

799 **Tycho** Mcreations, Inc., 329 Horizon Way, Pacifica, CA 94044; 415/359-7649.

U

800 **Userland IPC** Userland Software, Inc., 1100 Sharon Park Dr., Menlo Park, CA 94025; 415/854-0662.

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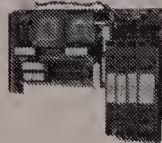
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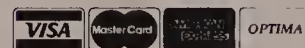
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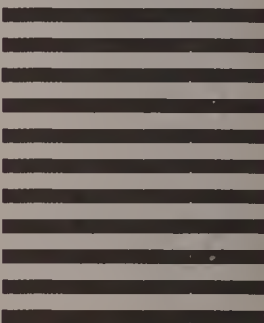
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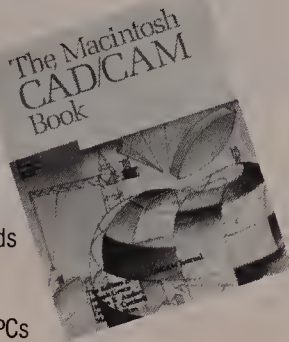
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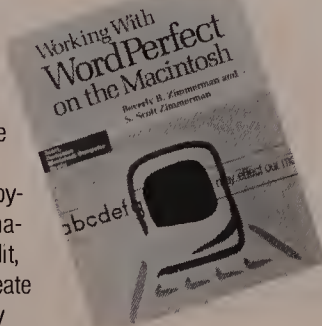
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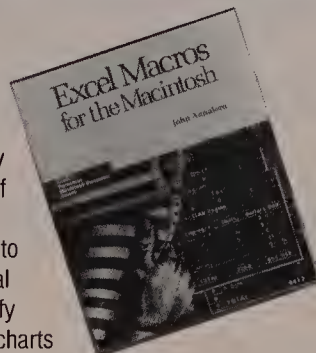
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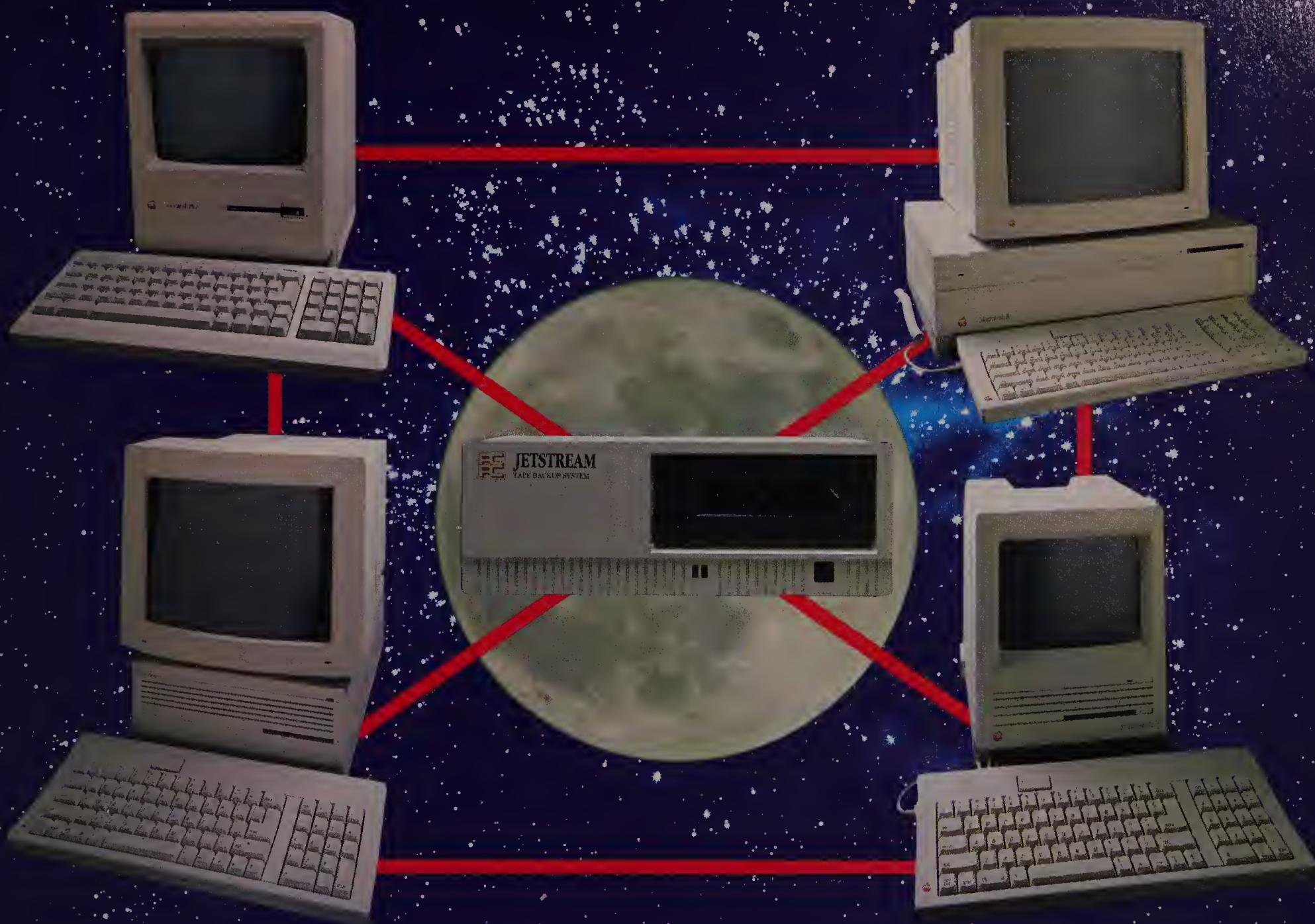
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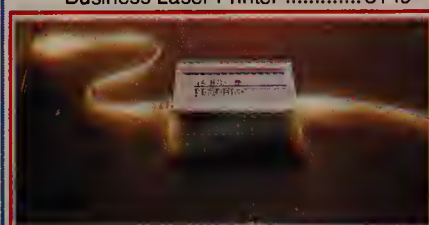
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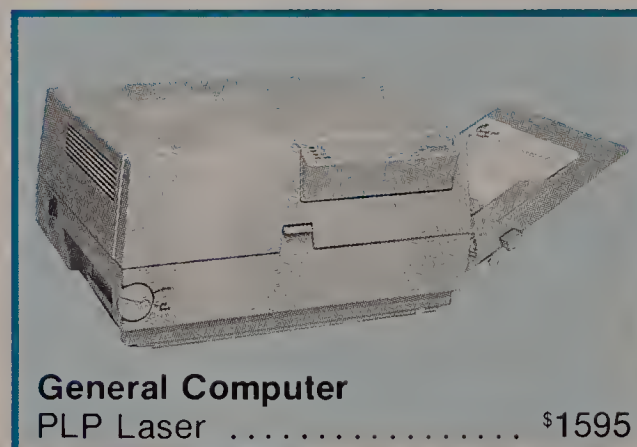
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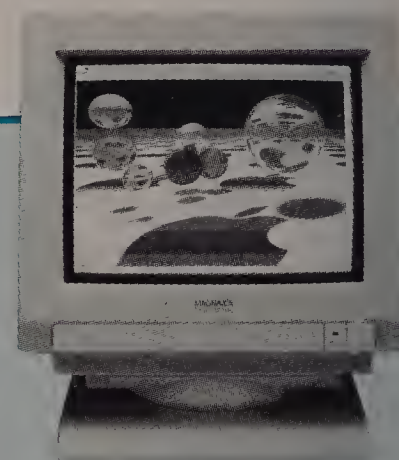
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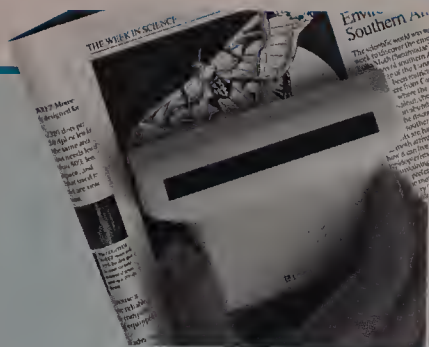
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MacBEST 45 28ms	\$499.	\$479.
Quantum 40* 19ms	\$599.	\$569.
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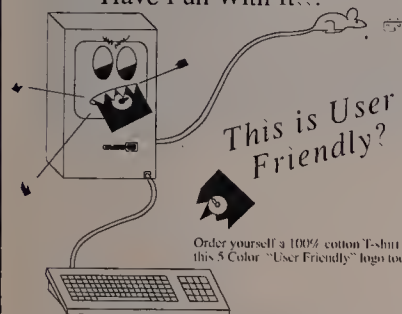
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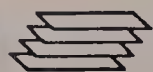
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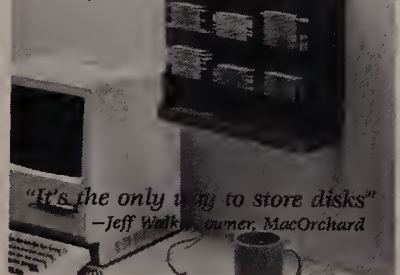
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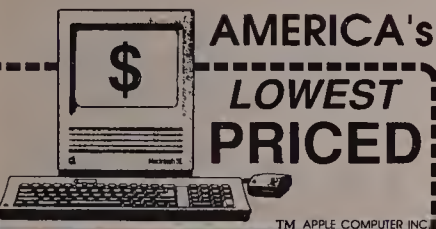
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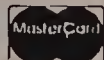
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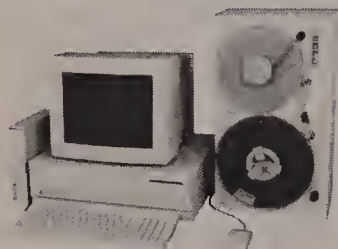
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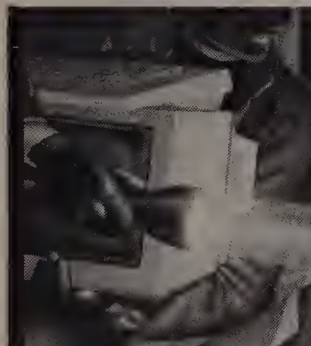
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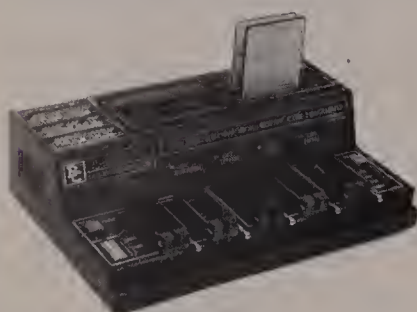
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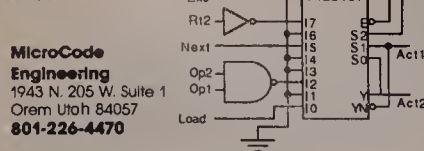
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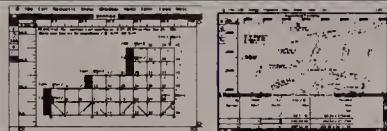
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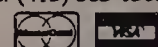
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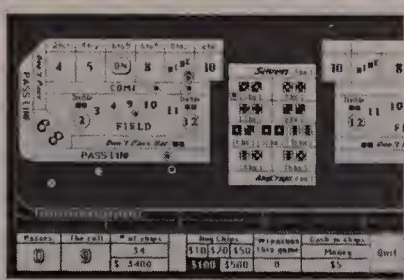
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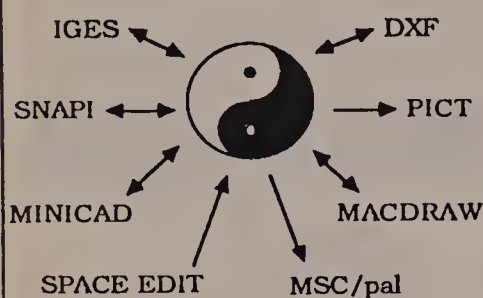


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6	Jun 01 88	Jun 01 88	500.00	500.00	99.00	5.09	80 073.04	0.00
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8	Aug 01 88	Aug 01 88	500.00	500.00	99.10	5.05	83 154.54	0.00
9	Sep 01 88	Sep 01 88	500.00	500.00	99.15	5.03	84 702.79	0.00
10	Oct 01 88	Oct 01 88	500.00	500.00	99.20	5.01	86 256.04	0.00
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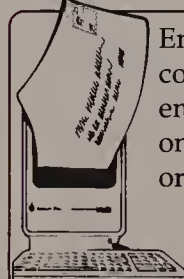
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30	1	2	Microsoft Works <i>Microsoft</i>
42	2	3	Microsoft Excel <i>Microsoft</i>
38	4	4	PageMaker <i>Aldus</i>
27	7	5	MacWrite <i>Claris</i>
40	6	6	MacDraw <i>Claris</i>
11	5	7	WordPerfect for the Macintosh <i>WordPerfect</i>
8	—	8	QuarkXPress <i>Quark</i>
5	10	9	FreeHand <i>Aldus</i>
9	—	10	Adobe Illustrator/Illustrator 88 <i>Adobe</i>

▼	▼	▼	EDUCATION SOFTWARE • • • • •
18	1	1	Reader Rabbit <i>The Learning Company</i>
5	2	2	Where in the World Is Carmen Sandiego? <i>Brøderbund</i>
34	3	3	Math Blaster <i>Davidson & Associates</i>
30	—	4	KidsTime <i>Great Wave Software</i>
31	4	5	Typing Tutor <i>Simon & Schuster</i> <i>Computer Software</i>

▼	▼	▼	ENTERTAINMENT SOFTWARE • • • • •
34	1	1	MacGolf <i>PCAI</i>
3	2	2	Crystal Quest <i>Casady & Greene</i>
30	4	3	Dark Castle <i>Silicon Beach Software</i>
14	—	4	Falcon <i>Spectrum HoloByte</i>
33	3	5	Flight Simulator <i>Microsoft</i>

▼	▼	▼	NETWORK/DATA COMMUNICATIONS • • • • •
30	1	1	TOPS <i>TOPS</i>
26	2	2	AppleShare <i>Apple Computer</i>
33	4	3	LocalTalk <i>Apple Computer</i>
1	—	4	NetWare <i>Novell</i>
4	—	5	Red Ryder <i>FreeSoft</i>

Months on chart	Last month	This month	
▼	▼	▼	HARD DISKS* • • • • •
16	—	1	FX20 <i>General Computer</i>
11	1	2	MacStack SD20 <i>CMS Enhancements</i>
25	3	3	Apple Hard Disk 20SC <i>Apple Computer</i>
17	—	4	Rodime 20 Plus External <i>Rodime</i>
5	—	5	Apple Hard Disk 40SC <i>Apple Computer</i>

▼	▼	▼	ADD-IN BOARDS • • • • •
8	1	1	Radius Interface Display <i>Radius</i>
21	2	2	Radius Accelerator <i>Radius</i>
8	—	3	Video Board/Large Screen <i>Ryad</i>
20	4	4	Apple 2MB Memory Expansion Kit <i>Apple Computer</i>
1	—	5	LocalTalk PC Card <i>Apple Computer</i>

PRODUCT WATCH

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Editors' choice of other recent or forthcoming products of particular interest.

Cosmic Osmo *Activision HyperCard game*

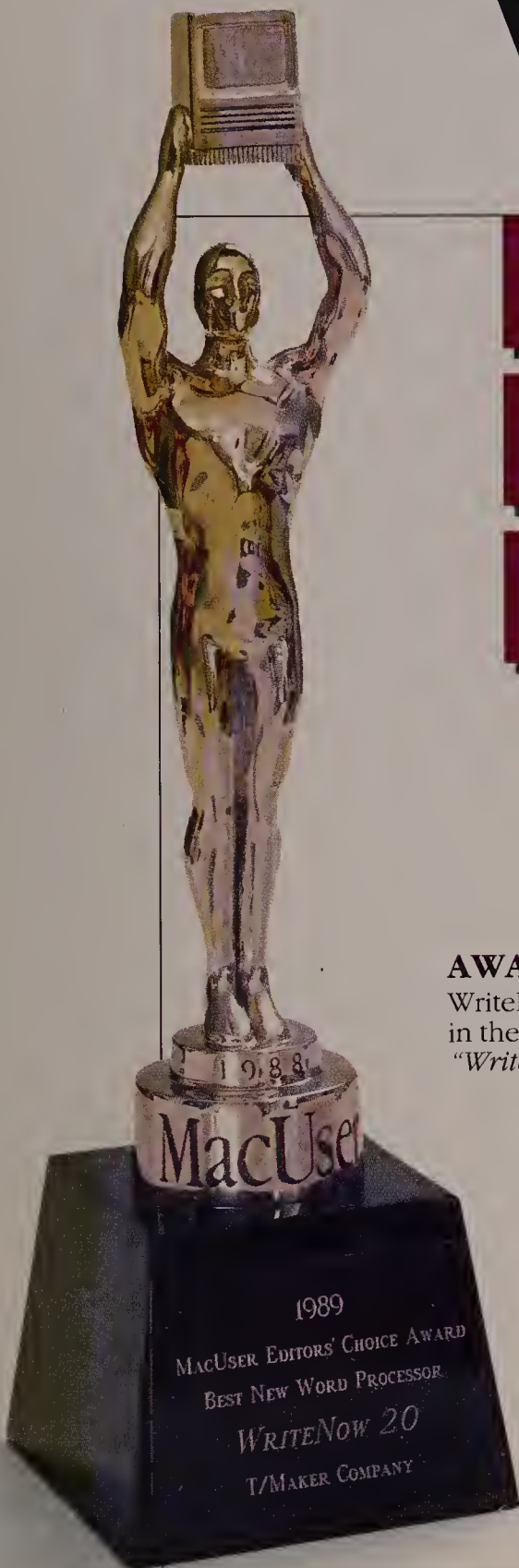
Microsoft Word 4.0 *Microsoft new version of word processor*

SuperPaint 2.0 *Silicon Beach Software paint and draw program*

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during April 1989.

*Does not include hard disks installed at the factory.

The Right Choice... WriteNow.



"BEST NEW WORD PROCESSOR"

—MacUser Magazine, May 1989

"READER'S CHOICE"

—MACazine, January 1989

"GOLDEN GAVEL AWARD"

—MacGuide, Winter 1988



AWARDS & RECOGNITION

WriteNow is the highest-rated word processor in the Macintosh world. MacUser Magazine said it best—*"WriteNow wins best new word processor hands down."*





EASY-TO-LEARN, EASY-TO-USE

If we were to pick one word that our customers use to describe WriteNow, it's *usable*. A great word processor is more than just a stockpile of features—it's the *usability* of those features, how easy they are to learn and use, and how they feel under your fingertips when doing *real work*. Everyone claims ease-of-use, but WriteNow actually delivers it—and our awards and ratings prove it.

BUSINESS POWER & PERFORMANCE

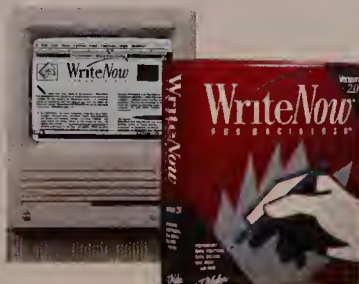
WriteNow has all the power business users need, including: Mail merge; 100,000 word spelling dictionary; multiple columns; in-line graphics; format accelerators (style sheet equivalents); outline indenting, character and word counting, fixed and flexible line spacing, and much more. As important, WriteNow is the fastest word processor in the Mac world, whether you've got a small Mac 512KE or a loaded Mac IIcx.



	<i>Copy & paste large area</i>	<i>Search for a word</i>	<i>Spell check document</i>	<i>Change indents & double spacing</i>	<i>Undo ruler changes</i>
 WriteNow 2.0	6.7 sec.	2.9 sec.	7.4 sec.	23.3 sec.	1.6 sec.
 MacWrite II	45.9 sec.	40.2 sec.	33.6 sec.	44.7 sec.	24.7 sec.
 MS Works 2.0	1 min. 50.8 sec.	35.7 sec.	5 min. 13.4 sec.	2 min. 24.1 sec.	1 min. 14.5 sec.
 MS Word 4.0	21.6 sec.	11.0 sec.	3 min. 55.1 sec.	39.4 sec.	25.8 sec.

All tests performed starting with a 12-page text document on a Macintosh Plus with a 20 megabyte hard disk. Full repagination performed when necessary.

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